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Vol. 2 *July 5, 1946* No. 1

UNITED STATES DEPARTMENT OF COMMERCE

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Vol. 2 July 5, 1946 No. 1

CONTENTS

CHEMICALS AND ALLIED PRODUCTS....1 - 5
AGRICULTURAL CHEMICALS....1
PLASTICS AND PLASTICIZERS....1
PAINTS, VARNISHES AND LACQUERS....1 - 2
INORGANIC CHEMICALS....2
ORDNANCE CHEMICALS....2 - 5
GERMAN....2
UNITED STATES....2 - 5
ANALYTICAL CHEMISTRY....5

DETERIORATION STUDIES....6

ELECTRICAL MACHINERY, EQUIPMENT, AND SUPPLIES....6 - 27
COMMUNICATION EQUIPMENT....6 - 10
GERMAN....6 - 7
ITALIAN....7
JAPANESE....8
UNITED STATES....8 - 10
ELECTRONICS....10 - 23
GERMAN....10 - 14
UNITED STATES....14 - 23
GENERATORS, MOTORS, TRANSMISSION, DISTRIBUTION AND ALLIED EQUIPMENT....23 - 24
GERMAN....23
JAPANESE....23 - 24
UNITED STATES....24
MISCELLANEOUS....24 - 27
GERMAN....24 - 25
JAPANESE....25
UNITED STATES....25 - 27

FOOD AND KINDRED PRODUCTS....27

FUELS AND LUBRICANTS....27 - 28

INSTRUMENTS (PROFESSIONAL, SCIENTIFIC AND CONTROLLING)....28 - 31
GERMAN....28 - 29
UNITED STATES....29 - 31

LEATHER AND LEATHER PRODUCTS....32 - 33

MACHINERY (EXCEPT ELECTRICAL)....33

MEDICAL RESEARCH AND PRACTICE, INCLUDING CLINICAL APPLICATION OF DRUGS AND PHARMACEUTICALS....33

METALS AND METAL PRODUCTS....34 - 41
GERMAN....34 - 35
JAPANESE....35
UNITED STATES....35 - 41

METEOROLOGY AND CLIMATOLOGY....41

ORDNANCE AND ACCESSORIES....42 - 54
BRITISH....42
GERMAN....42 - 45
ITALIAN....45
JAPANESE....45 - 46
UNITED STATES....46 - 54

PACKING AND PACKAGING....54

PAPER AND ALLIED PRODUCTS....54

PERSONNEL APTITUDE TESTING AND JOB TRAINING....54 - 55

PHOTOGRAPHIC AND OPTICAL GOODS (INCLUDING PHOTOGRAPHIC PROCESSING)....55 - 56

RUBBER AND RUBBER PRODUCTS....56

STONE, CLAY AND GLASS PRODUCTS....56

STRUCTURAL ENGINEERING....56 - 57

TEXTILES AND TEXTILE PRODUCTS....57 - 59
GERMAN....57 - 58
UNITED STATES....58 - 59

TRANSPORTATION EQUIPMENT....59 - 72
AERONAUTICS....59 - 68
AIRCRAFT....59 - 64
GERMAN....59 - 62
JAPANESE....62 - 63
UNITED STATES....63 - 64
INSTRUMENTS....64 - 65
ENGINES AND PROPELLERS....65 - 68
GERMAN....65 - 67
JAPANESE....67 - 68
UNITED STATES....68
AIRPORTS AND AIRWAYS....68
LAND TRANSPORTATION....68 - 70
GERMAN....68 - 70
UNITED STATES....70
MARINE TRANSPORTATION....70 - 72

WATER SUPPLY, SANITATION AND PUBLIC HEALTH....72 - 73

MISCELLANEOUS....73 - 78
BRITISH....73
FRENCH....73
GERMAN....73 - 77
UNITED STATES....77 - 78

LIST OF ABBREVIATIONS

BELOW ARE LISTED ABBREVIATIONS USED IN BIBLIOGRAPHY FOR THE NAMES OF GOVERNMENTAL AGENCIES AND OTHER ORGANIZATIONS ISSUING REPORTS.

AAF	ARMY AIR FORCES	JIOA	JOINT INTELLIGENCE OBJECTIVES AGENCY.
AFETO	ARMY FORCES IN THE EUROPEAN THEATER OF OPERATIONS.	NDRC	NATIONAL DEFENSE RESEARCH COMMITTEE.
AFMPAC	ARMY FORCES IN THE MIDDLE PACIFIC	NAVAER	NAVY DEPARTMENT BUREAU OF AERONAUTICS.
AFMTO	ARMY FORCES IN THE MEDITERRANEAN THEATER OF OPERATIONS.	NAVDOCKS	NAVY DEPARTMENT BUREAU OF YARDS AND DOCKS.
AFPAC	ARMY FORCES IN THE PACIFIC.	NAVORD	NAVY DEPARTMENT BUREAU OF ORDNANCE.
AMC	AIR MATERIEL COMMAND.	NAVSHIPS	NAVY DEPARTMENT BUREAU OF SHIPS
ATI	AIR TECHNICAL INTELLIGENCE.	OPRD	OFFICE OF PRODUCTION RESEARCH AND DEVELOPMENT.
ATIC	ARMY TECHNICAL INTELLIGENCE CENTER.	OSRD	OFFICE OF SCIENTIFIC RESEARCH AND DEVELOPMENT.
ATSC	AIR TECHNICAL SERVICE COMMAND.	QMB	QUARTERMASTER BOARD.
BIOS	BRITISH INTELLIGENCE OBJECTIVES SUB-COMMITTEE.	QM	QUARTERMASTER CORPS.
CIOS	COMBINED INTELLIGENCE OBJECTIVES SUB-COMMITTEE.	SHAEF	SUPREME HEADQUARTERS ALLIED EXPEDITIONARY FORCES.
CWS	CHEMICAL WARFARE SERVICE.	SIG CORPS	SIGNAL CORPS.
EEIS	ENEMY EQUIPMENT INTELLIGENCE SERVICE.	TIIC	TECHNICAL INDUSTRIAL INTELLIGENCE COMMITTEE.
FIAT	FIELD INFORMATION AGENCY, TECHNICAL.	WPB	WAR PRODUCTION BOARD.
JDL	JAHRBUCH DER DEUTSCHEN LUFTFAHRTFORSCHUNG.		

THE FOLLOWING PB REPORTS, ABSTRACTS OF WHICH APPEAR ON THE PAGES INDICATED IN PARENTHESES, ARE NOW AVAILABLE FROM THE SUPERINTENDENT OF DOCUMENTS AT THE PRICES GIVEN AFTER EACH NUMBER:

PB NOS.	PRICE
19094 (P. 1490)	$0.45
19096 (P. 1490)	.75
19100 (P. 1483)	.20

PB 12467. P. 677. DEBELL, JOHN AND OTHERS. MILITARY PLANNING DIVISION, OFFICE OF THE QUARTERMASTER GENERAL. GERMAN PLASTICS PRACTICES. A GMC OVERSEAS INVESTIGATION TEAM REPORT. 1945. 374 p. THIS PUBLICATION IS NOW AVAILABLE IN MIMEOGRAPH FORM FROM THE PUBLICATION BOARD FOR $3.50.

CHEMICALS AND ALLIED PRODUCTS

Agricultural Chemicals

PB 20788. DIEKE, SALLY H. and RICHTER, CURT P. Age and species variation in the acute toxicity of alpha-naphthyl thiourea. n.d. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
Marked age variation was found in the susceptibility of wild Norway rats to acute poisoning. Suckling rats were about seven times as resistant as adults. For adult Norway rats LD50 was between 6 and 8 mg/kg body weight. Adult animals of other species varied markedly in susceptibility to acute ANTU poisoning. Norway rats, dogs and mice were killed by amounts less than a hundred milligrams per kilogram. Alexandrine rats, guinea pigs, and cats required several hundred milligrams, while chickens and monkeys survived doses of several grams per kilogram body weight. Large amounts of pulmonary edema were found only in Norway rats, dogs, mice and cats. References, tables and graph are attached.

Plastics and Plasticizers

PB 16373. I. G. FARBENINDUSTRIE. Polymerisationsprodukte der butadienreihe. (Polymerization products of the butadiene series). (Enlargement print of part of microfilm 182-6). May 1935 - Jan 1936. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Polymerization of a mixture of β-chlorobutadiene with α-chlorobutadiene leads to products which will stay soft and elastic for months. These documents are concerned with a patent application and also with an earlier application I 51948/39b1. In German.

PB 16354. I. G. FARBENINDUSTRIE. Verfahren zur herstellung stabiler wässeriger dispersionen von polymerisationprodukten (Method for production of stable aqueous dispersions of polymers). (Enlargement print of part of microfilm 182-4). Mar 1941 - Jul 1942. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
Addition of aqueous solutions of alkali hydroxides or neutral or alkaline-reactive alkali or ammonium salts stabilizes dispersions of products of polymerization which contain solvent-free, soap-like emulsifying agents. These documents are concerned with patent application I 69144 IV c/39b, 22/06. In German.

PB 16374. I. G. FARBENINDUSTRIE. Verfahren zur herstellung von diolefinpolymerisaten. (Method for production of diolefine polymers). (Enlargement print of part of microfilm). Dec 1934 - Aug 1938. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
Valuable mixed polymers are obtainable by polymerization of mixtures of butadiene and dichlorobutadiene. The latter can be produced from tetrachlorobutane by separation of hydrochloric acid. Polymerization is performed by allowing to settle, heating, irradiating, adding alkali metals or alkali earths, or emulsion polymerizing. The mixed polymers are vulcanizable. These documents apparently accompany patent application I 51280 IVe/39b1, which is additional to application I 45869 IVc/39b, probably issued as 662281. The opinion is expressed that American patent 1,965,369 has prior claim. In German.

PB 14587. KÜCH, W. and RIECHERS, K. Kunststoffe und ihre verwendung im flugzeugbau (Synthetics and their use in aircraft) (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik, II C 21). (ALSOS Mission, Klotter File 11 B). Jan 31, 1941. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
This is one of a series of studies published by the German Air Ministry. The report reviews the preparation, properties, and uses of hard, molded plastics. Phenol formaldehyde and urea formaldehyde products with various fibers, layers or filling agents are described and their properties tested. Glass-substitute plastics, such as celluloid, cellulose acetate and polyvinyl chloride and methacrylate polymers are similarly treated. The report contains graphs, photographs, tables, and a bibliography.

PB 9026. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verfahren zur herstellung von schallplattenmassen. (Method for manufacturing phonograph disc substances). German patent application T57070 IXa/42g. Mar 18, 1942 and still pending. Original inventors: Severin and Hinz. 1942. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

Paints, Varnishes and Lacquers

PB 22812. BIDDLE, J. W. Synthetic coatings for gasoline tanks. (Naval Tech Mission in Europe Tech Rept 280-45) Aug 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
A visit was made to the Schwaeler Iron Works at Schwelm which had made many of the large tanks used in German warships and tankers, and also claimed to be one of the larger producers of "jerry" cans, the ingenious closure of which was developed by Herr Grünvogel of this firm. The application of synthetic coatings to the inside of tanks used for gasoline storage was investigated. Details of method are given in this report. For small tanks (up to 250 gallons) baked phenol-formaldehyde resin coatings were used. For larger tanks where baking was impractical or impossible, a plasticized, nitrocellulose, air-dried lacquer was used. This lacquer, however, was modified by the addition of a soluble urea-formaldehyde resin which was cured by the addition of phosphoric acid to effect good adhesion, and to render the film insoluble in gasoline. Tanks coated with this lacquer have been satisfactorily in service for a period of at least three years. The composition of the lacquers used was learned from the Wiederhold Lacquer Company at Hilden which supplied them. Information concerning the resins used in the lacquers was obtained at I. G. Farbenindustrie in Höchst. Here, also the method of coating concrete tanks used for the storage of gasoline was obtained from Dr. Dietz who supervised the construction of such tanks in North Africa, western France, and elsewhere. The information pertaining to the concrete tanks is being included in a more comprehensive report.

PB 22818. HOPKINS, CHARLES A. Insulated coatings of electric motor coils developed by Vereinigte Lackfabriken, Hamburg. (Naval Tech Mission in Europe Tech Rept 389-45) Sep 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
Vereinigte Lackfabriken, which manufactures paints, coatings, lacquers and varnishes for specialized uses, is considered one of the foremost German firms in this field. This report describes the company's most recently developed varnish for use in insulating electric motor, rotor and stator coil windings, and the two methods recommended for its application. The vacuum method of application herein described is reported to be a new development.

PB 22824. HOPKINS, C. A. Oil and gasoline resistant coating for concrete floors. (Naval Tech Mission in Europe Tech Rept 390-45). Sep 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This report is a discussion of a concrete floor coating compound which is resistant to gasoline, oil and bensol, manufactured by Vereinigte Lackfabriken of Hamburg, Germany. Included is the processing formula, a treatment for new concrete prior to application, and a method of applying.

PB 22823. HOPKINS, C. A. Oil and gasoline resistant coating for lining concrete tanks. (Naval Tech Mission in Europe Tech Rept 389-45). Sep 1945. 3 p. Price: Microfilm-50¢ - Photostat-$1.00

Vereinigte lackfabriken of Hamburg, Germany, manufactures coatings for specialized uses. This report discusses a preparation made by this concern for coating the interior surface of concrete storage tanks, which was stated to be resistant to oil, gasoline, benzol, etc. The processing formula is included.

Inorganic Chemicals

PB 21119. FAIR, G. M. and RENN, C. E. Biological nitrification of urine. (OSRD Rept 3462) Apr 1944. 59 p. Price: Microfilm-$1.00 - Photostat-$4.00
The nitrogen in human urine may be converted to nitrates by subjecting it to the action of a mixed, natural flora of nitrifying bacteria upon beds of crushed limestone coated with small amounts of soil. About 30 grams of nitrate may be obtained per cubic meter of bed per day. The effluent yielded is a 1.75% solution of calcium nitrate together with other urine salts. Efficiencies depend upon care of operation; under usual conditions about 75% recovery may be expected; but with adequate laboratory control this may be improved to 90% or better. Chemical control is obtained by observing the concentrations of nitrite. Good conditions are indicated by traces or total absence of nitrite; unsatisfactory by rising nitrite concentrations. This provides a convenient indication for increasing or decreasing the rate of feeding urine to the system. Previous methods of intensive nitrification of ammonia have been reviewed and described in this report. These have been tested, along with other promising processes (Appendices I, II, III and IV). Because of the peculiar chemical and physical properties of urine (its limited nitrogen content, chlorids, carbonate, sulfate, and phosphate content, its alkaline reaction after fermentation, and its high surface activity), the method developed in this report is recommended.

PB 18798. MCKEE, LOGAN. Production and use of hydrogen peroxide by the Germans during World War II. Mar 1946. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
This is an address presented by Capt. McKee, U.S.N., before the American Society of Mechanical Engineers, describing the physical properties and uses of hydrogen peroxide. Hydrogen peroxide was also called Ingolin and T-Staff. The peroxide is very explosive and practically any oxidizable substance can act as a catalyst to cause an explosion. However, it is possible to store it safely in stainless steel, glass, ceramics, polyvinyl chloride and other synthetic plastics. As the temperature rises stabilizers may be added and the peroxide rendered safe. Peroxide has been used by the Germans as a primary and secondary fuel. As a primary fuel the heat of dissociation of H_2O_2 into H_2O and O_2 produces 994 BTU's per lb. This is only one tenth that of a pound of oil but it has the further advantage of providing oxygen where needed. As a primary fuel, it powered V1 and V2 rockets. The hydrogen peroxide was mostly used as a secondary fuel because more heat can be obtained from a fuel mixture. The temperature reached is about 2200°C., which is too high and the Germans add water which brings the temperature down to 550°C. As a secondary fuel, the peroxide was mixed with decalene (sulfur-free Diesel oil) or methyl alcohol. A mixture called "Helmann" which combined the fuel and a liquid catalyst was sometimes used. As a secondary fuel, peroxide was used to power torpedoes, submarines and airplanes.

PB 21127. WILCOX, R. C. Production of ammonia from urine: Progress report. (OSRD Rept 1724) Aug 1943. 41 p. Price: Microfilm-50¢ - Photostat-$3.00
This report summarizes the results of work on the production of ammonia from human urine by bacterial (appendix I) and by enzyme (appendix II) action. The two processes are simple and require only the simplest equipment. The product contains 0.8 - 1.0% ammonia and must be concentrated by simple distillation to obtain a product suitable as feed to an ammonia oxidation plant producing nitric acid. One ton of ammonia can be produced from about 35,000 gal of urine which is approximately the amount per day from 85,000 people. One ton of ammonia is sufficient to produce over three tons of 100% nitric acid. Details including drawings of equipment, tables and diagrams appear in the report.

Ordnance Chemicals

German

PB 22814. LAWSON, W. E. Explosives research and development in Germany. (Naval Tech Mission in Europe Tech Rept 326-45) Sep 1945. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
This brief report attempts only to give an over-all picture of German research and development in the production of propellents and high explosives and to point out items requiring further work in the United States to demonstrate their value to our special requirements.

United States

PB 20671. BENNETT, H. S. The density of brombenzylcyanide. (Edgewood Arsenal Chemical Div Rept 210) Aug 1922. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
The investigation detailed in this report was undertaken to determine the density and coefficient of expansion of brombenzyl cyanide of high purity. The density varies linearly from 1.4908 gm. per cc. at 4°C. to 1.4235 at 65°C. The coefficient of expansion is 7.75×10^{-4}. Experimental details and results are given, accompanied by tables and a graph.

PB 20715. BETTS, W. V. Stabilization of acrolein. (Edgewood Arsenal Chemical Div Rept 172) May 1922. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This report had two objectives; (1) to determine the facility with which acrolein could be prepared and (2) to find ways of stabilising acrolein. It was determined that acrolein could be prepared very easily by distilling glycerine with anhydrous magnesium sulphate. Tests were then conducted to find suitable stabilizing agents as it was known that acrolein rapidly lost its toxic effects due to polymerization. Gallic acid, pyragallol, hydroquinone, sodium hydroxide and sulphur dioxide were tested. The most effective was hydroquinone, which allowed the polymerization of only 25% of the acrolein in fifteen months.

PB 20720. BLAYLOCK, F. R. Preparation of dichlordiethylsulphone. (Edgewood Arsenal Chemical Div Rept 177) Jun 1922. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
The method for the preparation of mustard sulphone and mustard sulphoxide was that used by Helfrich and Reid (J. Am. Chem. Soc. 42, 1208, 1920). Crude mustard was converted to the sulphoxide by running it slowly into thoroughly agitated concentrated nitric acid cooled below 20°C. On completion of the reaction the sulphoxide was obtained in crystalline form by pouring the reaction product into water. The dry sulphoxide was then oxidized in a solution of chromic and sulphuric acids, the resulting sulphone separated, washed with hot water in the molten state, and dried. The yield of sulphoxide on 10 runs out of 12 was 64.7% of theory (about 250 g. per run) and the yield of sulphone 44.3% of theory, both based upon pure mustard. 10 lbs. of the sulphone were prepared. Table I shows yields of mustard sulphoxide and Table II shows the effect of temperature upon the formation of sulphone.

PB 20704. BLAYLOCK, F. R. Preparation of dinitrotetrachloroethane. (Edgewood Arsenal Chemical Div Rept 157) May 1922. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
One hundred and fifteen grams of dinitrotetrachloroethane, having a melting point of 142-143° C., were prepared by the method of Argo, James and Donnelly (CWS-Catalytic Section, Part I, page 80). Tetrachloroethylene was prepared by reducing hexachloroethane with zinc dust in a 5% sulphuric acid solution and was purified by distillation. The boiling point was 120-122° C. This was then heated with Nitrogen peroxide in a Carius tube at 80° C. for six hours. The dinitrotetrachloroethane was purified by crystallization from

cold alcohol. The object of the work was simply to collect a sufficient amount of dinitrotetrachloroethane for test purposes and not a method for obtaining the maximum yield of the product. Bibliography.

PB 20673. BROWN, S. F. Binders for starters. (Edgewood Arsenal Chemical Div Rept 212) May 1922. 39 p. Price: Microfilm-50¢ - Photostat-$3.00
This investigation of binding materials for starters includes: (1) the determination of the solubility of 12 promising binders in 6 common solvents; (2) the methods of applying the binders to the starters; (3) the effect of the binder on the starter when bound; and (4) the extent of the protection afforded by the binders. Among the conclusions reached are the following: (1) no binder was found which would prevent no. 2 starter from deteriorating, especially when exposed to a humid atmosphere; and (2) the presence of a binder tended to increase the impact sensitivity of a starter. Tables and a drawing are included in the report.

PB 20712. BROWN, S. F. Starting mixtures. (Edgewood Arsenal Chemical Div Rept 168) May 1922. 188 p. Price: Microfilm-$2.00 - Photostat-$13.00
During the investigation of starting mixtures, one hundred and fifty-six (156) different combinations have been tested, with an average of ten (10) variations in the proportions of each mixture, making a total of one thousand, five hundred and sixty (1,560) mixtures. From this number, seventy-five (75) starters were selected for further investigation. The study of starting mixtures consisted essentially of the following: The development of starters; the testing of starters on three smoke devices; the determination of the effect on starters of humid atmosphere, water, carbon tetrachloride, hexachlorethane and storage under the most adverse conditions; the determination of the fuse sensitivity, the impact sensitivity, the pressure developed per gram of starter, the heat of combustion, and the ignition temperature. Starting mixtures were eliminated whenever an undesirable feature became apparent. Mixtures containing hygroscopic materials, such as barium dioxide, sodium nitrate, and sodium chlorate, were eliminated from final tests. It was decided that a satisfactory starter could be developed from two, or three, components. Starters containing more than three were tested only when they were to be used for particular purposes. Detailed information concerning all starters may be found in tabulated form in the body of the report. Drawings of equipment are included.

PB 20791. DOESCHER, RUSSELL N. (Comp.) and BURG, ANTON B. (Ed.). The physical and physico-chemical properties of hydrogen cyanide: A summary of pertinent data from the chemical literature, presented to the Chemical Warfare Service. n.d. 90 p. Price: Microfilm-$1.00 Photostat-$6.00
The data included in this compilation were mostly those physical and physico-chemical properties considered most useful to Chemical Warfare Service. A few chemical properties were included. Far more emphasis is placed upon literature subsequent to the year 1915 than upon older publications. The source of each item is indicated. The following data is covered in this report: vapor pressure and related data, density, boiling and freezing points, distribution ratios, thermodynamic properties, ionization and electrical conductivity, dielectric and refraction data, spectra of HCN, surface tension of pure HCN, corrosion caused by HCN, and materials for use in structures with HCN and its aqueous solutions. Bibliography is attached.

PB 22045. EASTES, J. W. and MACY, R. The flow characteristics of solutions of: Crepe rubber in a benzene-Levinstein HS mixture; chlorinated rubber in Levinstein HS, in chlorobenzene, and in a simulated HS; coumarone-indene resin in Levinstein HS, and in flash-distilled Levinstein HS. (CWS Tech Div Memo Rept 687) Jun 1943. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
The object of the work was to obtain data on thickening agents in order to make such data available for comparison with other similar data and for comparison with data from airplane spray tests. The viscosities of solutions of rubber in a 50/50 mixture by weight of Levinstein HS (mustard gas) and benzene decrease with aging. Chlorinated rubber (Parlon) dissolved in Levinstein HS, chlorobenzene, or simulated HS gives solutions of similar flow characteristics in that all are non-Newtonian. Each decreases in apparent viscosity with increasing rate of flow or shear. Coumarone-indene resin (Neville resin R-1) gives the same type of solution in both Levinstein HS and flash-distilled Levinstein HS, the solutions being Newtonian at all flow rates which can be accurately measured in the capillary viscometers used in this work. Glossary, tables, and bibliography are included in the report.

PB 22044. EASTES, J. W. and MACY, R. Thickened vesicants; the flow characteristics of Levinstein HS and of pure HS. (CWS Tech Div Memo Rept 693) Jun 1943. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
The object of the work described in this report was to determine the flow characteristics of Levinstein HS (mustard gas) and pure HS in order to determine whether or not the flow characteristics of the thickened vesicant could be attributed to the vesicant or the thickener. Levinstein HS and pure HS are Newtonian liquids, their viscosities being independent of the rate of flow used in the measurement. Pure HS has a lower viscosity than newly made Levinstein HS. Levinstein HS that has aged decreases in viscosity to approach that of pure HS. The viscosity of a purified HS was found to be 0.0353 poises at 30°C; that of Levinstein HS to be 0.0638 poises at 30°C. The non-Newtonian behavior of thickened mustard is apparently due almost entirely to the thickener rather than the solvent. Table bibliography and graph are included in the report.

PB 20744. EHRENFELD, DAY. The use of the 75 mm. gas shell for the dispersion of chloracetophenone solutions. (Edgewood Arsenal Chemical Div Rept 115) Mar 1922. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
While chloracetophenone is one of the most powerful lachrymators it has been found practicable to use, it has heretofore possessed decided persistence, but, since no nonpersistent lachrymator approaches it in effectiveness, an effort has been made to determine whether a more efficient dispersion would not produce a nonpersistent cloud from chloracetophenone. By reducing its persistence it was expected that a given weight of this material would give a greater concentration over a given area for a given length of time. It was desired to use a base ejection shell for dispersion of such a lachrymator. A highly lachrymatory, invisible cloud, relatively nonpersistent, has been produced in static tests by ejecting solutions of chloracetophenone in benzene and in benzylcyanide from base-ejection shell by means of charges of black powder (FFG) and of T.N.T. Three blueprints are attached, two of the shell and one of boosters for the shell.

PB 20669. FREAS, R. Preparation of chlormethylphenyl sulphone. (Edgewood Arsenal Chemical Div Rept 199) Aug 1922. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Chlormethylphenyl sulphone was prepared by the action of benzene sodium sulphinate on the sodium salt of dichloracetic acid, but cannot be prepared by the direct chlorination of methylphenyl sulphone in various solvents. Its properties and toxicity are given. It is concluded that the compound is of little interest as a war agent.

PB 20735. GROESBECK, W. M. and WITHERSPOON, M. G. Lethal concentration of phosgene for dogs for 7-1/2 minute exposure. (Edgewood Arsenal Chemical Div Rept 101) Jan 1922. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
It was determined that the least concentration which would cause a majority of deaths lay between 1.08 and 1.15 milligrams per liter. The report describes the condition of the animals during exposure, the physiological condition of the animals while alive and the examination of the internal organs of the animals that either died before 10 days or were killed after 10 days.

PB 22040. HARRIS, B. L. Simulated lewisite. (CWS Tech Div Memo Rept 736) Sept 1943. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
The object of this investigation was to develop a nontoxic material simulating the physical properties of Lewisite (L) in order to determine the ballistics of various L-filled munitions. Simulated L for shell charging for ballistic studies can be produced by mixing 32.6% tetrabromo-ethane (acetylene tetrabromide) and 67.8% carbon tetra-chloride by weight. The historical, theoretical, and experimental data covering this investigation together with discussion, conclusions, recommendations, and bibliography are given in the report.

PB 20672. HODGSON, H. C. Preliminary investigation of method of preparation of methyl dichlorarsine. (Edgewood Arsenal Chemical Div Rept 211) Aug 1922. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
Two general methods of preparation of methyl dichlorarsine were investigated: (1) chlorination of cacodyl derivatives; and (2) methylation of alkali salts of arsenious acid. The first method was discarded because of the danger in working with these compounds and the expense incident to their production. In using the second method, two methylating agents were employed. With methyl sulfate the yields were prohibitively low. Using methyl iodide, the yields were quite good when the sodium methyl arsonate was separated from the reaction mixture before reduction and chlorination of methyl dichlorarsine. An unsuccessful attempt was made to bring about this separation by precipitation of the sodium methyl arsonate as the magnesium salt. It was successfully isolated by adding an equal volume of alcohol to the reaction mixture which, almost completely, threw the sodium salt out of the solution in a crystalline form.

PB 22037. LEMAIRE, HENRY. Investigation of methods for increasing the melting point of WP. (CWS Tech Div Memo Rept 793) Jan 1944. 26 p. Price: Microfilm-50¢ Photostat-$2.00
The object of this work was to attempt to raise the melting point of WP (white phosphorus) above 65°C. either by dissolving in it some substance which would raise the melting point or by partially or completely converting WP to red phosphorus. Sulfur was the only material found which, when added to WP would raise the melting point above 65°C. Phosphorus sesquisulfide, melting at 172°C., produces smoke, but is not as efficient as either WP or red phosphorus. Red phosphorus and WP converted to at least 40% red phosphorus have excellent smoke producing properties and melting points above 100°C. Theoretical and experimental data are given followed by discussion, conclusions, and recommendations. Photographs are attached.

PB 20689. McCRUMB, F. R. and REEVES, A. M. Preparation of chlorinated mustard derivatives. (Edgewood Arsenal Chemical Div Rept 232). Dec 1922. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
A study of the chlorinated derivatives of mustard, particularly the chlorinated sulphoxide and sulphone, was undertaken to obtain a vesicant which is not easily chlorinated. Trichloro and tetrachloro diethyl sulfoxide were prepared, the latter apparently being more stable; their toxicity was determined also. In attempts to prepare chlorinated mustard sulfone, it was indicated that mustard sulfone itself is a vesicant which cannot easily be destroyed by either chlorination or oxidation.

PB 20782. PATTEN, H. E. and BOURNE, M. M. Chemical properties of phosgene. (Edgewood Arsenal Chemical Div Rept 124) Mar 1922. 50 p. Price: Microfilm-50¢ - Photostat-$4.00
This report is one of a series presenting the chemical properties of certain chemical warfare agents to serve as a reference work and guide to the literature. A brief critical evaluation of the experiments and statements reported in the literature is given wherever it seemed desirable. For the sake of uniformity and as an aid to coordination with future research work, the material in these reports has been arranged under the official project sub-divisions. The information in this report on phosgene has been gathered from the technical files, from monthly project reports up to and including the month of March 1922, and reports submitted up to and including March 29, 1922.

PB 22039. PECORELLA, S. S. and MACY, R. Vapor pressure of pure mustard. (CWS Tech Div Memo Rept 738) Sep 1943. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
Vapor pressures of liquid H (mustard gas) determined by the air transference method at 25, 35, and 45°C., and boiling points under reduced pressure, agree well with the recent British data, and can be expressed by the equation $\log P = 9.589 - \frac{3140}{T}$, where P is mm.Hg and T is absolute temperature. No attempt was made to verify the British values for the vapor pressure of solid H, which can be expressed by the equation $\log P = 12.792 - \frac{4062}{T}$. Historical and experimental data are given as well as discussion, conclusions, recommendations, and bibliography. A graph and photograph are included.

PB 20679. PFANSTIEL, ROBERT. Destruction of mustard gas by ozone. (Edgewood Arsenal Chemical Div Rept 218). Oct 1922. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
It has been found that ozonated air will destroy HS (mustard gas), converting it to dichlorodiethylsulfoxide, a non-toxic solid. Neither woolen nor cotton cloth when treated with HS and then subjected to the action of ozonated air showed deterioration in tensile strength. It was found that the present gas mask canister would protect against the ozone concentrations encountered in this work, namely, from 10 to 15 mg./l. for a period of at least one half hour. It is concluded that the destruction of HS by means of ozonated air is not practicable unless some more efficient method of generating ozone can be developed.

PB 20668. REEVES, A. M. Preparation of chlormethylmethyl sulphate. (Edgewood Arsenal Chemical Div Rept 198) Jul 1922. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
Chlormethylmethyl sulfate was prepared by the action of sulfur trioxide on monochlordimethylether. Its properties and toxicity are given, being non-lachrymatory. Attempts to use it for the introduction of the chlormethyl group were unsuccessful. With potassium thiocyanate there was some reaction but none between chlormethylmethyl sulfate and either ammonium thiocyanate or potassium cyanate.

PB 20670. ROUGHTON, H. W. New methods for ship fumigation; U. S. Public Health Service and Chemical Warfare Service. (Edgewood Arsenal Chemical Div Rept 200) Aug 1922. 62 p. Price: Microfilm-$1.00 - Photostat-$5.00
This is a report of the investigation of fumigation by the generation and liberation of hydrocyanic acid and cyanogen chloride. The final method adopted consisted of the use of sodium chlorate, sodium cyanide, and dilute hydrochloric acid, and is claimed as a "new and safe fumigant." A discussion of the historical and theoretical aspects, the properties, methods of analysis, experimental data, and fumigation method and costs is presented. Also included are bibliographies and supplements entitled "Use of U. S. Army Gas Mask" and "Cyanogen Chloride and Hydrogencyanide Canister." Appended are a drawing and photographs.

PB 20600. WATSON, PAUL D. Determination of the vapor pressure of brombenzylcyanide. (Edgewood Arsenal Chemical Div Rept 70) Sep 1921. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
This report gives the results of an investigation on the vapor pressure of brombenzylcyanide. The vapor pressure was determined over the temperature range from 25°C to 125°C. by means of the static method described by A.W.C. Menzies (J. Am. Chem. Soc. Nov 1920) and D.H. Parker (E.A.C.D. Rept No. 46, June 1921). Tables and a graph are given.

PB 20693. WATSON, PAUL D. Determination of the vapor pressure of mustard gas. (Edgewood Arsenal Chemical Div Rept 242). Jan 1923. 34 p. Price: Microfilm-50¢ - Photostat-$3.00
Experimental data, calculation of results, general discussion of results, and tables make up the report. The data presented was obtained by means of two methods; the static (McLeod gauge) over the temperature range from 14° to 86°C., and the dynamic (boiling point) from 116° to 184°C. Tables, photographs, diagram and graph are included.

PB 18861. WILLIAMS, J. W. and others. The characterization and solubility of fractionated wood pulp and cotton linters nitrocellulose, to Mar 1, 1944. (OSRD Rept 4123). Sep 1944. 45 p. Price: Microfilm-50¢ - Photostat-$3.00
This report describes a method of fractionating nitrocellulose by partial precipitation of a solution of nitrocellulose in 3:5 alcohol-acetone solvent on addition of varying amounts Skellysolve B (boiling range 60-68°C.). By application of this method a sample of Higrade nitrocellulose made from cotton linters was separated into twenty-eight fractions, and a sample of Higrade nitrocellulose made from wood pulp was separated into forty-seven fractions. The nitrogen contents of the fractions were determined by a specially developed analytical method based on use of Devarda alloy, and information about the length of the nitrocellulose chain was obtained by measurements of viscosity. Tables and graphs illustrate the report. This is the final report under contract with the University of Wisconsin.

PB 20687. WITHERSPOON, S. C. Preparation of dimethylaniline arsenious oxide. (Edgewood Arsenal Chemical Div Rept 229). Dec 1922. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This compound was made by the action of arsenic trichloride on dimethylaniline. It was prepared in an attempt to obtain a compound which would pass through the canister of the gas mask. However, due to the instability of the compound, the test was discontinued.

Analytical Chemistry

PB 20732. COX, E. P. A polarizing cell method for determining chlorine in air. (Edgewood Arsenal Chemical Div Rept 195) Jul 1922. 49 p. Price: Microfilm-50¢ Photostat-$4.00
The depolarization effect of chlorine upon a specially constructed electrolytic cell is employed to determine the momentary concentration of chlorine in air. This apparatus has been developed for use in connection with experimental field tests and is of a fairly simple and portable form. The increase of the current obtained from this cell is a measure of the chlorine concentration. Chlorine concentrations as low as 0.01 mgm. per liter and as high as 100 mgm. per liter have been measured without difficulty. The sensitivity and range of the cell may be varied by regulating the rate of flow of electrolyte or gas or both. The depolarization effect may be measured with a millimmeter or by using a shunt with a potentiometer. The historical and experimental data, procedure, operation, calculations, and results are given in the report. Photograph, diagrams, and graphs illustrate the text. Recommendations and suggestions are attached.

PB 20711. DANNER, CHARLES E. Sampling and analysis of mustard gas in field tests. (Edgewood Arsenal Chemical Div Rept 167) May 1922. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
An apparatus and absorbent for the sampling of mustard gas clouds in the field and a method of analysis of the sample are described. The apparatus is a glass bulb 2" diameter by 9" long, containing glass beads, provided with inlet and outlet tubes and packed in a canister. The absorbent is 50 c.c. of a mixture of 79% glacial acetic acid, 9% concentrated nitric acid and 12% water. The total amount of mustard in the sample may be determined with an error of less than 0.0005 mg/l.

PB 20682. DANNER, C. E. Sampling and analysis of mustard gas in field tests, charcoal method. (Edgewood Arsenal Chemical Div Rept 223) Nov 1922. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
Using a specially prepared charcoal the mustard gas is absorbed by means of a sampler through which the gas is drawn. The analysis of the sample for mustard gas is made by combustion in an electric furnace. The decomposed mustard gas is absorbed in 200 cc. of an aqueous solution of 5% sodium sulfite crystals and 1% sodium bicarbonate. The chlorides resulting from the decomposition can be determined either gravimetrically or by the Volhard titration method. A high degree of effectiveness is shown for the method both in adsorption by the charcoal and in the analysis.

PB 20676. HINE, T. B. and CLARK, D. The rate of evaporation of liquids in a current of air. (Edgewood Arsenal Chemical Div Rept 215). Dec 1922. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
Evaporation experiments in a wind tunnel with a number of liquids are described in detail. It was shown experimentally that the number of mols of any liquid evaporating per unit time into a current of air is proportional to the vapor pressure of the liquid, and that the rate of evaporation of a free liquid surface is proportional to the wind velocity measured near the surface. By determining, in the field, the rate of evaporation and the resulting air concentration for one substance for certain methods of distribution, the rate of evaporation and resulting air concentrations for any other substance, when distributed in the same manner, can be calculated. This assures a simplification of method and economy of effort in the study of the persistance of chemical warfare agents in the field. Bibliography, tables, graphs, and photographs are attached to the report.

PB 19861. LADD, J. H. and others. Field assessment of chemical agent contamination density by radio tracer and by dye tracer methods. (CWS Tech Div Memo Rept 1235) Feb 1946. 39 p. Price: Microfilm-50¢ - Photostat-$3.00
The objects of this report are: (1) To describe standard analytical procedures for field assessment of surface contamination by airplane sprays of chemical agents, using (a) dye tracer and (b) radio tracer; and (2) to compare the dye and radio tracer methods in the evaluation of airplane spray dispersion of DDT in fuel oil. The report discusses the problems involved in the choice between a dye and a radio tracer. The radio tracer method had certain advantages: The kind and intensity of radiation was independent of light, temperature, pressure, and chemical state of the radioelement; solution of the compound is simple; field samples are prepared very quickly; the radio tracer method is very sensitive and the only method applicable for volatile chemical agents. However, it is expensive, requires special equipment and deteriorates. The dye method had been used for many years and the advantages and disadvantages were well known. In these experiments, radio manganese (Mn^{52}) was used with gamma Geiger-Mueller counters. If radio phosphorus (P^{32}) were used, beta Geiger-Mueller counters could be used as they were forty times as sensitive as the gamma counters. The tests themselves are described and tables show the results of all phases of the tests and calculations. The preparation of the radio elements are discussed. The radio tracer method was found to be more sensitive and it was recommended wherever the extra expense of the radio tracer was justified. Formulas, glossary and bibliography.

PB 20716. ROWE, A. M. Charcoal method of determining chloropicrin in air. (Edgewood Arsenal Chemical Div Rept 175) Jun 1922. 15 p. Price: Microfilm - 50¢ - Photostat - $1.00
A method of determining the amount of chloropicrin absorbed in an ashless charcoal has been developed wherein as little as 10 mg. can be determined within 0.5 mg. The method may be adapted to the analysis of any gas containing a halogen. Extreme care must be exercised to follow the outlined method exactly, since technique plays an extremely important part in the accuracy of the method.

DETERIORATION STUDIES (INCLUDING TROPICAL DETERIORATION)

PB 5676. HANCOCK, JOHN H. Tropic tests of photographic airplanes, equipment and materials, July, August and September 1944. (AAF ATSC Memo Rept TSEPL-4-446-23-1) Nov 1944. 4 p. Price: Microfilm - 50¢ - Photostat - $1.00
The purpose of this brief memorandum is to report results of tropic tests conducted with photographic airplanes, equipment and material during the period from 10 July to 14 September 1944. One B-17 F airplane, with eight camera stations, and a regular production line F-5B airplane were used for all air tests conducted at a base in the Panama Zone. A total of more than 200 hours were flown in photographic testing and approximately 25 flights were made at 30,000 feet or over. Results of tests indicate that all materials suffer some kind of deterioration in the tropics, thus making careful maintenance, inspection, and storage of cameras and photographic equipment essential. A short bibliography is appended and a number of precautions to be observed under tropic conditions are listed.

PB 20339. JAFFE, L. S. Fungus resistance of equiangulator, model A-1A. (AAF ATSC Memo Rept TSEPP-681-160-3) Feb 1946. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
Tests to determine the resistance to fungus attack under simulated tropical conditions of a model A-1A equiangulator, an instrument used to determine geographical location by means of celestial observation. Most of the component parts were subject to either fungus growth, corrosion, or both. Recommendations for treatment of the various components are given. Photographs are included.

PB 20382. LOLLAR, ROBERT M. Preservation of shoe sewing thread. Progress report. (OSRD Rept 3069) Jan 1944. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
A study of the factors which influence shoe sewing thread stability is presented in this report. Based upon the conclusion that microbiological deterioration of the thread is the most logical cause of failure, work was carried out to develop methods of protecting the thread. Two formulae are suggested for use on the thread and on the leather soles in which the thread is used. From the laboratory data no advantage was evident for either formula and thus field trials of treated thread and leather soles were recommended. Factors influencing thread serviceability such as waxing of the thread and effect of leather on thread and preservatives for use on thread are discussed. Recommended methods of treatment are also included.

ELECTRICAL MACHINERY, EQUIPMENT, AND SUPPLIES

Communication Equipment

German

PB 17592. GERMANY. REICHSLUFTFAHRTMINISTERIUM. Bordfunkgerät FuG 16. (Air-borne radio set FuG 16). (MIS VII 71e 10 7001201; MIRS/V 1024). Mar 1942. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
This publication contains circuit diagrams of the subject radio equipment for use in the German army school.

PB 12493. LORENZ,(C.),A.G. Abtasteinrichtung für speicher in mehrfach-fernschreibanlagen. (Keying arrangement for storers in multiple teletype systems). German patent application L 111208 VIII a/21al, April 9, 1943, patent rejected as to inclosed letter from the patent office to patentee. Apr 9, 1943. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 12446. LORENZ,(C.),A.G. Einrichtung zur speicherung von telef. oder telegr. zu übermittelnden nachrichten zwecks geheimhaltung. (Arrangement for the recording of telephone or telegraph messages for the purpose of secrecy). German patent application L 106 241 VIII a/21a4. Dec 1, 1943. 9 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 19888. LORENZ, (C.), A.G. Verfahren zur gleichzeitigen übertragung von mehreren nachrichten nach der methode der zeitmodulation. (Impulsmodulation). (Method for transmitting multiple messages by means of pulse-time modulation). German patent application Reg. 434 dated Jan. 23, 1945 still pending. 1945. 8 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 8693. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Anordnung an verstärkern, an die verbraucher mit verschiedenen widerstand angeschlossen werden. (Arrangement for amplifiers which are connected to loads with different impedances). German patent application T84050 VIIIa/21a2 applied for Jul 27, 1940 and still pending. Original inventor: Thomsen. 1940. 9 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 10860. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zur selbsttätigen auswahl des jeweils günstigeren von zwei nachrichtenübertragungswegen (Arrangement for the automatic selection of the more favorable out of two communication channels, at any given time). German patent application T59069 VIIIa 21a4 applied May 6, 1943 and still pending original inventors: Thiel. 1943. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 10848. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Empfänger mit selbsttätiger scharfabstimmung zum empfang eines auf einer beliebig kurzen welle arbeitenden senders. (Receiver with automatic sharp tuning for the reception of a transmitter working on any short wave channel). German patent application T 59016 VIII a/21a4 applied Apr 19, 1943 still pending; original inventor: Sprits. 1943. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
Discriminator circuit for short waves fluctuating beyond the range of the automatic frequency control.

PB 10862. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Gegensprechanlage. (Intercommunication system). German patent application T59065 VIIIa21a, applied May 7, 1943 and still pending. Original inventor: Benecke. 1943. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9284. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Luftgekühlter elektrodynamischer lautsprecher hoher leistung. (A high power air-cooled electrodynamic loudspeaker). German patent application T57288 VIII a/21a2 Apr. 29, 1942, additional patent to DRP., i.e. German Reichs Patent 719011, still pending. Original inventor: Schulze. 1943. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 10844. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Schaltungsanordnung zur anpassung der mittleren trägeramplitude des senders an die niederfrequenzamplitude. (Circuit arrangement to coordinate the average carrier amplitude of a transmitter to the low frequency amplitude). German patent application T 58999 VIII a/21a4 applied for Apr 20, 1943 still pending. Original inventor: Müller. 1943. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 10859. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Schaltungsanordnung zur selbsttätigen auswahl des jeweils günstigeren von zwei nachrichtenübertragungswegen (Circuit arrangement for the automatic selection of the more favorable of two communication channels at any given time). German patent application T59056 VIIIa 21a4 applied May 6, 1943 and still pending. Original inventor: Thiel. 1943. 10 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 10847. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Ueberlagerungsempfänger für sehr kurze wellen. (Heterodyne receiver for very short waves). German patent application T 59002 VIII a/21a4 applied Apr 20, 1943 still pending. Original inventor Bürck. 1943. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9266. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Ueberlagerungsempfänger für zentimeterwellen. (An heterodyne receiver for microwaves). German patent application T57216 VIIIa/21a4. Apr 10, 1942, still pending. Original inventor: Dr. Gerhard. 1942. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 10863. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Uebertragungseinrichtung zum drahtlosen empfang mittels eines ueberlagerungsempfängers. (A transfer arrangement for wireless reception by means of a superheterodyne-receiver). German patent application T59078 VIIIa21a4 applied May 11, 1943 and still pending; original inventor: Feld. 1943. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 10864. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verfahren zur telegraphischen drahtlosen uebertragung von zeichen. (A procedure for telegraphic wireless transmission of numbers). German patent application T59 063 VIIIa 21a4. Applied May 11, 1943 and still pending; original inventor: Filipowsky. 1943. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 10854. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verstärkeranordnung mit bereitschaftsschaltung. (Amplifier arrangement with stand-by circuit). German patent application T 59039 VIII a/21a2 applied Apr 29, 1943 and still pending; original inventor: Grimm. 1943. 3 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 10843. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Zweistufiger verstärker, vorzugsweise für kurze wellen. (Two-stage amplifier, preferably for short waves). German patent application T 58997 VIII a/21a4 applied Apr 16, 1943 still pending. Original inventors: Bürck Walleuschek. 1943. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 19741. U. S. THIRD ARMY. SIGNAL SECTION. German field telephone FM-105/48. (Enemy Equipment Intelligence Service Rept 8-48) Jul 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
The FM-105/48 is a portable, local battery field telephone with provisions for the connection of a heavy conductor cable. It has several unusual features and the main advantage seems to be increased output. The report contains a wiring diagram and photographs.

PB 19743. U. S. THIRD ARMY. SIGNAL SECTION. German radio station "Le 70 KL 40". (Enemy Equipment Intelligence Service Rept 8-50). Jul 1945. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
This captured equipment consists of transmitter, receiver, antenna tuning unit, and power supply. It was probably manufactured by "Lorenz" in 1940. The transmitter has a frequency range of 300 to 600 kc and 1.5 to 7.5 mc in four bands; power output is approximately 170 watts; and emission is voice, tone, or CW. The receiver is a 16-tube superheterodyne having the same frequency range. Wiring diagrams and photographs are included.

PB 19744. U. S. THIRD ARMY. SIGNAL SECTION. Utilization of German carrier frequency set, Trägerfrequanzgerät TFb1 and TFb2. (Enemy Equipment Intelligence Service Rept 8-F-1). Oct 1944. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This report covers the use of German carrier frequency set TFb1 and TFb2, on open wire circuits, and on spiral four circuits. A block diagram and instructions for installation are included.

PB 19740. U. S. THIRD ARMY. SIGNAL SECTION. Variations of the German receiver Torn Eb. (Enemy Equipment Intelligence Service Rept 8-47). Jul 1945. 6 p. Price: Microfilm -50¢ - Photostat-$1.00
Two captured German receivers were examined. They are similar to the standard Torn Eb receiver, except for modifications. One receiver, used as an air alarm receiver, operates on a set frequency determined by a crystal. The frequency of the crystal was 2040 kc. It was evidently for use by an untrained operator. The other receiver was similar to the Torn Eb, except that it covered a higher frequency range (193.5 to 15,430 kc). Three photographs are attached.

PB 19737. U. S. THIRD ARMY. SIGNAL SECTION. Watchman's radio warning system 41, Wächter funkmeldeanlage 41 (Wfn/41). (Enemy Equipment Intelligence Service Rept 8-43) Jul 1945. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This captured equipment consists of a master control radio station and three sentry boxes equipped with radio substations. These boxes are located from 500 to 1000 meters from the master station. This report describes the installation and use of the warning system. The master station contains two identical radio sets, each comprising a transmitter, receiver, call system and power supply. The sentry boxes each contain a transmitter, receiver and power supply. The master transmitter sends an amplitude modulated signal at 35.3 mc; the sub-station transmits at 37.5 mc. Of the seven photographs illustrating the report, two are missing from this copy.

Italian

PB 20327. U. S. WAR DEPARTMENT. SIGNAL CORPS. Italian 80MM signal lamp. (Allied Forces Enemy Equipment Intelligence Service Rept 38) Apr 1944. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This captured lamp is a portable field equipment for communicating between two mutually visible points with flashes of light produced by electric or heliographic means. It is similar in many respects to the Italian 45 mm signal lamp (described in AFEEI336). The range in daytime is 10 km. for the electric signal and 22 km. for the heliographic signal. Parts list, diagram showing adjustments and controls, and photographs are attached.

PB 20314. U. S. WAR DEPARTMENT. SIGNAL CORPS. Italian radio set A. P. 5. Jan 1944. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
The A. P. 5 is a portable VHF two-tube transceiver, of the frequency range 58-64 mc. manufactured by Allocchio Bacchino and Co., Milan. The r. f. triode HRHF operates as a self-quenched supperregenerative detector in reception and as an r. f. oscillator during transmission. The audio tube, a TU 415 tetrode, functions as an audio amplifier or as modulator. Included are photographs and the circuit diagram.

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Japanese

PB 22215. U. S. WAR DEPARTMENT. Signal communication equipment directory: Japanese radio communication equipment. (Tech Manual E11-227A) Dec 1944. 87 p. Price: Microfilm-$1.00 - Photostat-$6.00
This directory summarizes information available about 27 Japanese radio transmitters, receivers, and transceivers. Also described are a radiosonde and a weather warning receiver. For each equipment photographs and information on frequency range, power output, type of signal, power source, tuning, transportation, tubes, etc., are given.

United States

PB 18001. COLLINS RADIO COMPANY, CEDAR RAPIDS, IOWA. Instruction book for Navy model TCS-5, radio telephone and telegraph transmitting and receiving equipment (and addenda no. 1, dated May 1943). Nov 1942. 159 p. Price: Microfilm-$2.00 - Photostat-$11.00
This instruction book covers the installation, adjustment and operation, and maintenance and service of the Navy model TCS-5 radio telephone and telegraph transmitting and receiving equipment. This equipment is a complete radio transmitting and receiving installation suitable for use in trucks, ambulances, motor cars, tanks, motor boats and in other services where severe vibration and shock may be encountered. The transmitter is capable of emitting either CW or voice modulated signals. The frequency range, 1500 kc to 12,000 kc, is covered in three bands. The frequency response of the transmitter is uniform within 3db from 300 cps to 3000 cps. The transmitter is rigidly constructed to give a high degree of frequency stability under the conditions incident to normal operation. The power output as measured at the plates of the power output tubes with normal supply voltage is 20 watts on voice and 40 watts on CW on all frequencies. The frequency range of the receiver is the same as that of the transmitter. The audio frequency response, measured through the entire receiver from antenna input to audio output is uniform within 5 db from 300 cps to 3000 cps. The input circuit is designed to operate efficiently from the regular transmitting antenna, the 20 foot vertical "whip" radiator. Power supplies are available for operation of the TCS series equipment from 12 volts d.c., 24 volts d.c., 32 volts d.c., 115 volts d.c., 115 volts 60 cps a.c., and 230 volts d.c. Parts lists, labeled photographs, diagrams, and schematics are included.

PB 17929. GENERAL ELECTRIC COMPANY. Instruction book for Navy model TCL FM radio transmitting and receiving equipment. (GEI 15330-A) Oct 1941. 101 p. Price: Microfilm-$1.50 - Photostat-$7.00
This equipment comprises a FM transmitter and a receiver designed for emergency communication. They have a frequency range of 30 to 42 mc., a nominal power output of 25 watts, with emission F-15, and are designed for mobile or fixed-station service. Construction and theory of operation of the units precede Instructions GEI-13620A and GEI-13622A on the installation, adjustment and operation and maintenance of the units and component parts. Parts lists, tables, photographs, schematic and connection diagrams and charts are included.

PB 22180. HERBSTREIT, JACK W. Field tests of radio set AN/TRC-2, 80-100 mile man pack equipment. (Sig Corps Rept ORD-P-13-2) Jul 1943. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Results of field tests of transmitter SCR-694 and receiver units of radio set AN/TRC-2 are reported. It was found that the 25 watt 80-100 mile man pack units provided communications for a considerable portion of the particular test period chosen even though a moderately severe ionospheric storm was disturbing sky wave transmission at the time. Recommendations are made that the actual power delivered to the antennas which are to be used with the sets be measured. Curves and circuit diagrams interpret the report.

PB 22178. HERBSTREIT, JACK W. and CRICHLOW, WILLIAM Q. Measurement of factors affecting jungle radio communication. (Sig Corps Rept ORD-2-3) Nov 1943. 48 p. Price: Microfilm-50¢ - Photostat-$4.00
Field strength measurements were made on 2005 kc, 5975 kc., 44 mc, and 98.8 mc to determine the attenuation of radio waves through heavy jungle. The attenuation was found to be so great that for communication greater than approximately one mile, the ground wave which is normally employed for these ranges is practically useless. It is shown that communications over greater distances than one mile necessitate either (1) treetop or hill to hill transmitter and receiver sites at very high frequencies so that the transmission path is mainly above the top of the jungle; or (2) use of sky wave transmission at high frequencies wherein the transmission path is up to the ionosphere and back to the ground. Measurements of "atmospheric" noise level were made on the frequencies 2005, 2700, 4160 and 5975 kc to obtain quantitative data on the signal intensity required for satisfactory communications for correlation with predictions of required signal intensity made on the basis of thunderstorm data. Tables and graphs are used in presenting the data.

PB 17970. NATIONAL COMPANY, INC., MALDEN MASSACHUSETTS. Instruction book for radio receiving equipment Model RBJ-1. Jul 1941. 87 p. Price: Microfilm-$1.00 - Photostat-$6.00
The subject receiving equipment manufactured for the Navy Department, Bureau of Engineering is a nine tube, rack mounted superhetrodyne utilizing plug-in coil sets to cover a frequency range from 50 to 400 and 480 to 30,000 kc. The receiver operates from a separate power unit and is suitable for ship or shore use for CW, MCW, or voice operation. This book provides a complete description of the equipment and maintenance and alignment information. Parts lists, labeled photographs, circuit diagrams, mounting drawings and performance curves are included.

PB 17799. NATIONAL COMPANY, INC., MALDEN, MASSACHUSETTS. Preliminary instruction book for Navy model REL-5 radio receiving equipment. Sep 1943. 56 p. Price: Microfilm-$1.00 - Photostat-$4.00
This model is suitable for stations ashore or afloat. The equipment may be used for the reception of radio telephone and telegraph signals (either CW or MCW) when detector radiation measured at the antenna input circuit must be less than 400 micro-micro-watts. This model is intended to operate from a 115 volt, 50-60 cycle A. C. supply source or from batteries or other D. C. sources capable of supplying 6.3 volts D. C. at 2.2 amperes and 135 volts D. C. at 30 milliamperes. Table of contents comprises: General description, installation, operation, alignment, maintenance, parts lists. The drawings and illustrations include photographs, outlines, diagrams and schematic diagram. The frequency range of the receiver is from 15 to 600 kc.

PB 17857. RADIO CORPORATION OF AMERICA MANUFACTURING COMPANY, INC. Instructions for Model RAB-4 radio receiving equipment, Class II, A-C operated. (Instruction Book 26655) Dec 1937. 74 p. Price: Microfilm-$1.00 - Photostat-$5.00
These instructions cover the installation, operation and servicing of this equipment comprised of these major units: A radio-frequency tuner, an intermediate- and an audio-frequency amplifier, and a power unit, and manufactured for the Navy Department, Bureau of Engineering. It is designed to provide optimum performance in the reception of pure, modulated or interrupted, continuous or clamped waves, and telephone-modulated radio frequency signals over the frequency range of 1,000 to 30,000 kilocycles. It is of the superheterodyne type and operates directly from a 110-, 115- or 120-volt, 60-cycle power supply. Outline and installation drawings, schematic, wiring, and connection diagrams and parts lists are included.

PB 22361. U. S. WAR DEPARTMENT. Amplifiers AM-92/TI and AM-93/TI and associated equipments. (Tech Manual 11-2573) May 1945. 52 p. Price: Microfilm-$1.00 - Photostat-$4.00

These amplifiers, manufactured by Stromberg-Carlson, are designed for the amplification and reproduction of sound over large areas. Amplifier AM-92/TI is equipped with three high-impedance inputs and dual outputs. Each input is individually controlled and separate master gain controls govern the level of each output channel. Amplifier AM-93/TI doubles the power output when used as a booster amplifier. High impedance dynamic type microphones, a magnetic cone speaker assembly, and a re-entrant horn speaker and transformer box assembly complete the equipment. Operating and maintenance instructions and parts lists are given. There are photographs, drawings, and a schematic diagram.

PB 22207. U. S. WAR DEPARTMENT. Connecting and switching kit MX-156/GT. (Tech Manual 11-2346) Sep 1944. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
This kit provides a quick and convenient means for establishing individual or conference telephone circuits among the battery executive officer, the battery assistant executive officer, and the six gun sections of an armored field artillery battery, when used with telephone equipment already issued. It also may be used for communication with an adjacent gun battery. Installation, operation, and maintenance are described in this manual. There are photographs and diagrams.

PB 22359. U. S. WAR DEPARTMENT. Electricord recording machine, model K-142. (Tech Manual 11-2554) Dec 1944. 194 p. Price: Microfilm-$2.00 - Photostat-$13.00
These electric recording machines, made by the Dictaphone Corporation, are capable of recording speech or signals from telephones, through microphones, or from radio receivers. Recordings are made on standard Dictaphone cylinders which may be transcribed on standard Dictaphone transcribing machines. Double mandrel, continuous recording machines of this type are not capable of electric reproducing. This manual gives detailed instructions for setting-up, operation and maintenance. A supplement dated February 1945 gives corrections and additions to the manual. There are photographs, tables and diagrams.

PB 22190. U. S. WAR DEPARTMENT. Interphone equipment RC-61. (Tech Manual 11-705). Feb 1942. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
This apparatus is a five-station intra-vehicular communication system for use in the light tank M3. It also enables the radio operator and tank commander to maintain radio voice communication with other vehicles and base stations. This manual describes the equipment and contains instructions for use and maintenance. Line drawings and diagrams are included.

PB 22209. U. S. WAR DEPARTMENT. Interphone equipment RC-99. (Tech Manual 11-702). May 1944. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
Interphone equipment RC-99 is a multi-station, intra-vehicular communication system for use in various types of mobile units. In addition to providing voice communication between all members of the vehicular crew, the interphone equipment enables the radio operator and vehicle commander to retain partial control of the vehicular radio apparatus for inter-vehicular and base-station voice communication. This manual contains installation, operation, and maintenance instructions, together with photographs, outline drawings and circuit diagrams.

PB 22223. U. S. WAR DEPARTMENT. Interphone equipments RC-48 and RC-60. (Tech Manual 11-710) Apr 1942. 29 p. Price: Microfilm-50¢ - Photostat-$2.00
These equipments are four station, intravehicular communication systems for use in light tanks M2A4 and M1A1, respectively. They also enable the radio operator and tank commander to retain partial control of the vehicular radio apparatus for inter-vehicular and base-station voice communication. Description of the equipment, installation, operator and maintenance instructions, and supplementary data are included in this manual. There are installation and wiring diagrams.

PB 22189. U. S. WAR DEPARTMENT. Interphone equipments RC-53 and RC-53-A. (Tech Manual 11-700). Feb 1942. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
This instruction manual covers six-station, intravehicular communication systems for use in the medium tank M3. Description, employment, maintenance and supplementary data are presented. Line drawings and circuit and wiring diagrams are included.

PB 22026. U. S. WAR DEPARTMENT. Limiter amplifier, type 3ELH, and speaker, type 6AL. (Tech Manual 11-2256) Nov 22, 1944. 35 p. Price: Microfilm-50¢ - Photostat-$3.00
The subject equipment is designed for use in railroad train dispatching and other centralized traffic control systems. The equipment consists of an amplifier and a separately housed loud-speaker. The amplifier unit amplifies incoming and outgoing telephone conversation. Description, installation, operation, and maintenance instructions are found in this manual. Illustrations include photographs, wiring, circuit and schematic diagrams.

PB 21920. U. S. WAR DEPARTMENT. Portable recorder. (Tech Manual 11-2511) Apr 6, 1944. 52 p. Price: Microfilm-$1.00 - Photostat-$4.00
This manual gives operating and adjustment instructions for a portable recorder manfactured by the Sound Scriber Corporation, New Haven, Connecticut. It is an electronic device which picks up sound by a microphone and converts it to electrical impulses. These impulses are increased by means of an amplifier to a point where energy is sufficient to move the diamond-tipped stylus in the recording head, which embosses the disc. To convert this "groove picture" back into sound the process is essentially reversed. Photographs, wiring diagram and parts list included.

PB 22348. U. S. WAR DEPARTMENT. Radio receiver R-96/SR. (Tech Manual 11-878) May 1945. 59 p. Price: Microfilm-$1.00 - Photostat-$4.00
Radio receiver R-96/SR is intended for use in harbor and sea-going vessels where extreme conditions such as tropical climates and salty sea atmosphere may be prevalent, and where severe vibrations and shock may be encountered. It is designed for operation alone or in combination with a radio transmitter. It is provided with four crystal-controlled channels for operation in a frequency range of 1700 to 8700 kc and a fifth channel for manual tuning over the ranges 135 to 510 kc and 1485 to 12,120 kc. CW, MCW, ICW and voice-modulated signals may be received. The receiver uses a superheterodyne circuit comprised of two stages of r-f amplification, a local oscillator, mixer, two stages of i-f amplification, a beat-frequency oscillator, detector, noise limiter, two stages of a-f amplification, and a rectifier. This manual gives instructions for installation, operation and maintenance. There is an appendix on moistureproofing and fungiproofing. Photographs and diagrams are included.

PB 22025. U. S. WAR DEPARTMENT. Radio set SCR-641-A. (Tech Manual 11-650) Sep 23, 1944. 239 p. Price: Microfilm-$2.50 - Photostat-$16.00
Radio set SCR-641-A is intended for use in the control of airport traffic. It provides two-way communication between the airport and aircraft, or between two airports. The main components are a radio transmitter (frequency range, 116 to 126.25 mc; output, 45 watts; emission, voice), a remote control unit, two superheterodyne receivers (range, 116 to 145 mc), two antenna systems, and a cabinet. This manual contains sections on description, installation and operation, functioning of parts, maintenance, and supplementary data. Photographs, schematic, wiring, and functional diagrams are included.

PB 22188. U. S. WAR DEPARTMENT. Radio sets SCR-197-B, SCR-197-C, SCR-197-D, SCR-197-E, and SCR-197-F. (Tech Manual 11-241) May 1942. 60 p. Price: Microfilm-$1.00 - Photostat-$4.00

These five radio sets are, for all practical purposes, alike, the different suffix letters merely indicating different procurements. The set is a high-power portable radio station. The transmitting equipment is installed in a truck and the receiver in an accompanying trailer. The transmitter, which may be remotely controlled has a frequency range of 1500 to 18,000 kc, a power output for CW of 300-400 watts, and for voice and tune, 125 to 150 watts. Full details on the transmitter are found in TM 11-808. Gasoline-engine driven power units for both transmitting and receiving equipment are furnished and used when commercial power is not available. The receiving equipment and the power units are described separately in TM 11-850 and TM 11-900, respectively. Photographs, diagrams, and curves illustrate this instruction manual.

PB 22347. U. S. WAR DEPARTMENT. Radiotelegraph transmitter T-50 M. (Tech Manual 11-838) May 1945. 76 p. Price: Microfilm-$1.00 - Photostat-$6.00
This transmitter is a wide-frequency range, 50-watt transmitter. Although designed for stationary field installations, the equipment is compact and light enough to be carried on a man's back if necessary. The set has a frequency range of 1500 to 12,000 kc, and the type of emission is CW. Installation, operation, functioning of parts and maintenance are taken up in this manual. Appendix I contains references and appendix II covers preventive maintenance. Diagrams, photographs, and drawings illustrate the work.

PB 22346. U. S. WAR DEPARTMENT. Radio transmitter T-83/SR. (Tech Manual 11-837) May 1945. 79 p. Price: Microfilm-$1.00 - Photostat-$6.00
Radio transmitter T-83/SR is a 50-watt telephone and telegraph marine radio transmitter. Either CW or phone transmission is available on any of five present channels in the frequency range between 1700 and 8700 kc. Provisions are made for remote control operation of the transmitter. It requires approximately 460 watts at 100% modulation or about 390 watts when used for telegraphy. This manual describes the installation, operation, and maintenance of the set, together with supplementary data and an appendix on moisture-proofing and fungiproofing. There are photographs, block, circuit, and schematic diagrams.

PB 22218. U. S. WAR DEPARTMENT. Signal lamp equipment EE-84. (Tech Manual 11-391). Oct 1942. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
Signal lamp equipment EE-84 is a portable field equipment for transmitting messages by means of white or red flashes of light in International Morse Code. A signal lamp, which has a sighting telescope, is mounted on a lamp mounting. A level, a compass, and an azimuth circle on the lamp mounting provide means for laying the beam on the target. An elevating mechanism is also provided. It has a range of 5,000 yards in sunlight and many times this range at night. This manual describes operation, servicing and repair of this equipment. A parts list and photographs are included.

PB 22024. U. S. WAR DEPARTMENT. 6-KW R-F amplifier PA-1A, rectifier RA-1A, and antenna tuning unit AT-1A. (Tech Manual 11-1055) Mar 28, 1945. 118 p. Price: Microfilm-$1.50 - Photostat-$8.00
This amplifier equipment described in this instruction manual is intended for fixed military radio telegraph service as a 6- to 10-kw amplifying unit used in conjunction with a nominal 350-watt, 150- to 550-kc radio transmitter as a source of r-f driving power. Photographs, tables, graphs, and diagrams are included.

PB 22022. U. S. WAR DEPARTMENT. Trainer BC-968-A. (Tech Manual 11-1062). Apr 10, 1944. 86 p. Price: Microfilm-$1.00 - Photostat-$6.00
This is an instrument designed to facilitate the training of operators for radar set SCR-268 by duplicating conditions encountered in actual field operation. It is used with oscilloscope BC-412 which is a part of the actual radar set. By rotating the handwheel attached to the trainer, the operator may track or follow a course just as he would when using the actual set for aircraft detection. He observes two pulses on the screen of the oscilloscope, and when they are of equal height, the trainee is on target. Cams make it possible to practice tracking different courses, both in azimuth and elevation. The effects of interference, noise and fading are simulated mechanically. The power source used is 115-volt, 60-cycle, alternating current. Instructions are given for the installation, operation, and maintenance of the trainer. Supplementary data tables, wiring diagrams, charts, photographs and a parts list are included.

PB 21965. U. S. WAR DEPARTMENT. SIGNAL CORPS. Public address set AN/TIQ-3. (Tech Manual 11-2531). Nov 1944. 96 p. Price: Microfilm-$1.00 - Photostat-$7.00
This manual gives installation, operation, functioning of parts, and maintenance of this portable public address system designed for fixed operation in the 50 to 10,000 kc range. It is composed of Control Unit C-104/TIQ-3, Amplifier AM-34/TIQ-3, Power Supply Unit PE-214-B (or any 115-or 230-volt, 50- to 60-cycle a-c (alternating-current) source), Handset TS-13-( ), and 12 permanent magnetic Loudspeakers LS-104/TIQ-3. The handset, or a monitor speaker on the control unit, permits two-way communication with selected loudspeakers, or may be used to communicate over the whole system. A tone generator provides a constant, intermittent, or warble tone, which may be sent over the system for signaling. Parts list, photographs, outline drawings, block, cording and schematic diagrams are included.

PB 21969. U. S. WAR DEPARTMENT. SIGNAL CORPS. Reproducer, sound, portable. (Tech Manual 11-2561). Dec 1944. 50 p. Price: Microfilm-50¢ - Photostat-$4.00
This sound reproducer consists of a self-contained 2-speed turntable with pick-up arm, 5-tube amplifier, dynamic microphone, 8-inch permanent magnet dynamic loudspeaker, and associated connecting cables. It is intended for reproducing sound recordings for morale and training purposes, general entertainment, and for use as a public address system. It may be used with a film strip projector. It plays 10-, 12- and 16-inch records and two input circuits permit the simultaneous use of voice or sound reproduction. Speech may be superimposed on a recorded background by means of two individual volume controls. Installation, operating, maintenance and repair instructions are given. Parts list, photographs, drawings, block and schematic diagrams are included.

Electronics

German

PB 18240. BUCHHOLZ, HERBERT. Die einfachsten typen der e- und h-wellen in hohlleiter (Telefunken bericht ef-08). (The simplest types of e- and h- waves in wave guides). (Telefunken report ef-08). Jun 1944. 39 p. Price: Microfilm-50¢ - Photostat-$4.00
This summary was prepared for Telefunken with the intent to standardize the type designations of the two wave forms in wave guides. The various criteria of the waves are mathematically analysed and the results are tabulated. The German type designations seem to be somewhat different from the American. In German.

PB 18439. GERMANY. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Administrative correspondence. (ALSOS Mission, RFR 302 a). n. d. 42 p. Price: Microfilm-50¢ - Photostat-$3.00
This administrative correspondence contains administrative letters and telegrams between Helmholtz-Institute of the Reichstelle für Hochfrequenz-Forschung, the Reich highfre-

quency research department at Brannenburg, Germany, and the Electrotechnisches Versuchsamt der Reichsbahn (the electrotechnical experiment station of the state railways) at Munich and others. The correspondence is of an administrative nature and contains no information of importance. It includes requests for the loan of a Siemens sound intensity meter and condenser microphone, referring briefly to some test being made or to be made; mentions briefly some safety installation contemplated at Stampetto-Viaduct; requests information on test of a "Liberator", suggests exchange of stenographers; requests information on progress of training a smatiff; complains of shortage of manpower; discusses procurement of a car; and one letter from Müller and Co., Bremen, offering fire and safety installations against sabotage. Among the letters is a schematic circuit diagram for a noise amplifier.

PB 18451. GERMANY. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Bericht A 36 R/1944 über besprechung bei Firma Ristow (Ari-Fernwerk KG) in Berlin-Teltow über geräte zur streckenüberwachung. (Report A 36 R/1944 about discussions with the firm Ristow in Berlin-Telton about devices for the control of railroad tracks.) (ALSOS Mission, RFR 302c). Jan 1944. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
The reported discussion is about a device which uses a wire strung along the track as an antenna which is energized by a low power H.F. transmitter and indicates the approach of a person. See also PB 18450. In German.

PB 18450. GERMANY. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Bericht A 103 G/1944 über unternehmen Buntspecht der Technischen Nothilfe. (Report A 103 G/1944 about project "buntspecht" of the technical relief association). (ALSOS Mission, RFR 302 b). Mar 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Subject project refers to combat measure against railroad saboteurs in Russia. Various methods are discussed and recommendations for tests are made on one electronic device consisting of an antenna wire strung along the track and energized by a H.F. low power transmitter which would allow detection of the approach of a person by change of the field. See also PB 18451. In German.

PB 18456. GERMANY. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Bericht A 110 R/1943 über besprechung bei Firma Horny, Wien. (Report A 110 R/1943 about a conference at the firm Horny, Vienna). (ALSOS Mission, RFR 302 c). Jun 1943. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This report is about the demonstration at the factory of a railroad mine-detector and describes some faults of the test model and records revised operating specification supplied the manufacturer for this equipment. The mine-detector demonstrated was mounted on a small railroad truck operated on the principle that two coil systems which were symetrically arranged to each track, compensated each other. Any metal body placed near either track would throw the system off balance. The difficulties resulted in keeping the two coil system always at the same distance from the track as a cause of unequal distances between the tracks and the side-movement of the truck. In German.

PB 18448. GERMANY. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Bericht A 121 V/1944 über den entwicklungsstand der eisenbahn-minensuchgeräte. (Report A 121 V/1944 about the present stage of development of railroad mine-detectors). (ALSOS Mission, RFR 302 b). Apr 1944. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
The report refers to two types of railroad mine-detectors. The first type "Wien 41" has been service tested and showed satisfactory results. It is mounted on a small railroad truck and a RF signal emitted vertically over each track is picked up by two pairs of coils on either side of a track, each pair of coils is balanced and both pairs are also balanced so that the amplifier will indicate any off-balance in the fields. The second type operates on a UHF signal and has two dipole transmitting and receiving antennas, the latter are balanced similarly as in the first type. The development of this one is not advanced. In German.

PB 18453. GERMANY. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Bericht A 156 G/1943 über feststellung von gleisunterbrechungen durch elektrische messverfahren. (Report A 156 G/1943 about the determination of breaks in railroad track continuity by means of electrical measuring methods.) (ALSOS Mission, RFR 302 b). Aug 1943. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
The report refers to studies to determine track breaks caused by sabotage by measuring variations in the electrical resistance of the tracks. The appendix shows diagrams of resistances of tracks under different conditions. In German.

PB 18452. GERMANY. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Bericht A 166 R/1943 über besprechung bei den Atlaswerken in München über akustische verfahren zum abstandhalten zwischen zwei eisenbahnzügen. (Report A 166 R/1943 about a conference at the Atlaswerke in Munich regarding acoustic methods for keeping proper distances between two railroad trains). (ALSOS Mission, RFR 302 c). Sep 1943. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
The report describes four different methods which are applicable to solve subject project. None of these projects has been tested.

PB 14583. GLOCKER, R. Röntgenographische spannungsmessung. (Determination of strain through X-rays). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik II G 16). (ALSOS Mission, Klotter File 11 R) Jun 20, 1938. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This is one of a series of German Air Ministry pamphlets. The special advantages, which X-rays offer for testing materials, makes it particularly suitable for aircraft parts. The method of obtaining the X-ray on film and the determination and measurement of the strain through formulas is described as well as the X-ray equipment. Tables, graphs, photographs and bibliography are presented.

PB 16868. HOH. Circuit for the interference free reception of remote control, release and message signals. (AAF ATSC T-2 Translation 440) May 1945. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a translation of subject German patent application. The circuit sets into operation certain oscillation devices as relays or thyratrons. Charging links of an electrical, thermic or electro-mechanical type as RC-links or gas discharge sections and further trippling systems are attached to the release oscillator.

PB 14677. INSTITUT FÜR HOCHFREQUENZTECHNIK UND FLUGFUNKWESEN. Radar antennae and transformers; Collection of short contributions in German to the theory of high frequency technique and aviation communication. (ALSOS Mission, Klotter File No. 7 C) n. d. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
This is part of a report (pages 30-41) about the status of a number of studies on electronic projects. In German.

PB 19892. JUNG-LAEPER, CURT. Funkortungsverfahren, bei den die zu ermittelnde richtung aus der intensitätsgleichheit zweier empfangsspannungen hergeleitet wird, die sich infolge periodischer verlagerung eines maximums eines richtantennenfeldes ergeben. (Method for locating a transmitter by computing the wanted direction from the intensity comparison of two received signals which result from a periodical displacement of a maximum of a directional antenna field.) German patent application Reg. 375, dated July 23, 1943 still pending. Original inventor: Jung-Laeper, 1943. 8 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 22920. KAISER, H. F. European electron induction accelerators. (Naval Tech Mission in Europe Tech Rept 331-45) Oct 1945. 66 p. Price: Microfilm-$1.00 Photostat-$5.00

Betatrons, induction electron accelerators for the production of high energy X-radiation were under development in Germany during the war and also to some extent at present. This work is reviewed for the most part and details are given on the constructional features of 6 and 15 million volt betatrons and on the theory and design of 15 and 200 million volt betatrons. The smaller units, especially the Siemens 6 mv, are quite successful and more advanced than comparable American units. While no large machines were actually built the projected 200 mv Widaroe design introduces new features of value. Betatron patent ideas are reviewed. Photographs, construction and connection diagrams are appended.

PB 19890. LORENZ, (C.), A.G. Anordnung zur steuerung von sendern mit impulsen. (Arrangement for controlling pulsed transmitters). German patent application Reg. 429, dated Dec 21, 1944, still pending. 1944. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 19886. LORENZ, (C.), A.G. Antennenanordnung an einem flugzeug. (Antenna arrangement on an aircraft). German patent application Reg. 433 dated Jan. 17, 1945 still pending. 1945. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 19889. LORENZ, (C.), A.G. System von hochfrequenstechnischen einrichtungen zur abwicklung des verkehrs lenkbarer fahrzeuge. (System of high frequency operated equipments for the guidance of dirigible vehicles). German patent application Reg. 432, applied for Jan 17, 1945 still pending. 1945. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 19891. LORENZ, (C.), A.G. Verfahren zur aufzeichnung von räumlichen bildern. (Method to present dimensional images). German patent application Reg. 430 dated Jan. 3, 1945 still pending. 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 19893. LORENZ, (C.), A.G. Verfahren zur festlegung einer genauen richtung auf einer in einem fahrzeug angebrachten skala von einem entfernten ort aus. (Method for determining from a distant place, the precise driving direction from an indicator in a vehicle). German patent application Reg. 355, still pending, dated Nov. 8, 1943. 1943. 8 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 19887. LORENZ, (C.), A.G. Verfahren zur feststellung bzw. überwachung von gegenständen. (System for the detection or observation of targets). German patent application Reg. 435, still pending, dated Jan 21, 1945. 1944. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
Subject patent refers to a method of pulse direction finding in which the receiver operates a distance from the transmitter, preferably between the transmitter and target.

PB 19885. LORENZ, (C.), A.G. Verfahren zur synchronen übermittlung von anzeigenwerten auf drahtlosen wege. (Method for the synchronous transmission of indicating values by means of radio). German patent application Reg. 356 dated Nov 3, 1943 still pending. 1943. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 15003. MEYER, GEORG. Messung der piezoelektrischen moduln von quarz, natriumchlorat und rhamnose. (Measurement of the piezoelektric moduli of quarts sodium chloride and rhamnose). Inaug. Dissertation, Univ. of Göttingen. (Supplementary material to PB-14620: Notes on interviews with German scientists on synthetic crystals in August and September, 1945). 1937. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
This paper discusses the theory, describes the apparatus and its use, the results obtained and a discussion of the results.

PB 14759. MÖLLER, H. and MEERFELD, H. Entwicklung neuer Röntgenverfahren. (Development of new X-ray methods). (Kaiser Wilhelm Institut für Eisenforschung). (ALSOS Mission, Hoyt File 26). 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
The report refers to the measurement of elastic stresses with the use of the Geiger-Müller-counter and to the instantaneous photography of X-ray interferences of areas of about 5cm² by using a reflector. In German.

PB 18528. PFRIEM, H. Differentialverfahren zur frequenzabhängigen eichung von messgeräten, besonders von empfängern für druckwellen grosser schwingungsweite. (differential method for the frequency dependent calibration of measuring devices for transducers for pressure waves of great amplitude). (ALSOS Mission, Gerlach IV A3; Reichsstelle für Hochfrequenzforschung Helsholtz-Institut, F. B. 3)
Aug 1944. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
The frequency dependent calibration of measuring devices for variable characteristics, particularly transducers of pressure waves with great amplitudes was up to now practicable only in the case of instruments with linear static calibration curves. Measuring devices of nonlinear qualities are usually at hand for the measurement of great amplitudes of oscillations. This report describes a method for determining the true angle of the measurement in question, from the distorted recordings of the instrument. The comprehension of the total measuring range is achieved by different adjustments of the mean value, which is unchangeable in time and around which small harmonic changes take place, from one series of frequency measurements to another. Given the hereby determined number of frequency response curves, the oscillatory characteristics (e.g. vibration, damping, mass) of the measuring device become calculable at first for small amplitudes of oscillation and for the various mean averages of pressure. These furnish, together with the static calibration curve, immediately the dependence of the oscillatory characteristics of the instrument on its deflection. The distortion of the actual measurement unused by the instrument, viz., the measurement itself, can thereby be ascertained from the distorted readings of the instrument.

PB 23093. SMITH, V. E. German work on atmospheric electricity with special applications to meteorology and radio systems. (U. S. Naval Tech Mission in Europe Tech Rept 539-45) Oct 1945. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
Atmospheric electricity may be classified for practical purposes into "cracking", "grinders", "minimum noise level", and "hissing". Studies conducted by Dr. Meinhold at the Reichsstelle für Hochfrequenzforschung reveal decided irregularities in the occurrence and behavior of these noise types and in the variation of noise with time of day, season of year, and weather phenomena. An electrostatic voltmeter, used in measuring atmospheric noise, was made sensitive down to 5 v/m. Airborne measurements were made with this equipment. Besides the possible meteorological value of the research on atmospheric electricity, Meinhold's studies may be useful in the improvement of discharging mechanisms for planes, projectiles, and antennas and in the further development of electrostatic homing devices. Graphs and diagrams are included.

PB 18218. SUHRMANN, R. and KRESSIN, O. Über die lichtelektrischen emissionszentren der alkali-antimonkathoden (About the photo-electric emission centers of alkali-antimony cathodes) (ALSOS Mission, Gerlach IVA15)
Dec 1944. 16 p. Price: Microfilm-50¢ - Photostat $2.00
This report is about a study made by members of the "Physikalisch-Chemisches Institut der Technischen Hochschule und der Universität Breslau" at the Telefunken laboratories for electron-research. The spectral sensitivity curves of cesium-antimony and potasium-antimony and potasium-antimony photo cathodes were developed for light frequencies up to 240 mμ. The analysis of these curves furnishes material for the production of high emitting cathodes for visible and infrared light. In German.

PB 18784. SWINERTON, ALLEN C. Report on the interrogation of German scientists regarding quartz crystals and other piezoelectric materials. (FIAT Final Rept 641). Dec 1945. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
It was learned from German scientists that the quartz synthesis by Nacken is most promising. The other scientists' attempts to grow quartz were not successful. The growth of substances other than quartz progressed to a degree but could not be considered highly successful. The growth of $NH_4H_2PO_4$ (ammonium dihydrogen phosphate) fell far short of the success obtained in the U. S. The principal movement in the quartz industry during the war was the conservation of raw quartz by drastic reduction in the size of oscillator plates.

PB 9282. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Anordnung zur elektrischen uebertragung von mehreren nachrichten mittels modulierter impulse. (Arrangement for the electrical transmission of several messages by modulated impulses). German patent application T57286 VIIIa21a/4 Apr. 29, 1942, still pending. Original inventor: Dr. Gerhard. 1942. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 10968. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Anordnung zur Herstellung von rechteckigen Impulsen Wechselnder Polarität und gleicher Dauer (An arrangement to produce square waves of alternating polarity and equal duration). German patent application T60 069 VIIIa/21a1 applied Feb 15, 1944 and still pending. Original inventor: Dr Grasl. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 19591. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Anordnung zur kühlung der aussenwand eines elektrischen entladungsgefässes. (Device for cooling the outside of an electrical discharge tube). German patent application T 56560 VIIIc/21g. Dec 2, 1941. Original inventor: Rohde. 1941. 4 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9288. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Anordnung zur verminderung der rückstrahlfähigkeit metallischer gegenstände für hochfrequente elektromagnetische wellen. (An arrangement to reduce the reflectivity of metallic objects with regard to high frequency electromagnetic waves). German patent application T59595 VIII a/21a4. Sep 9, 1943. Original inventor Dr. Rothe. 1943. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrations missing. Pages three and four hardly readable.

PB 9293. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Antennenanlage für rückstrahl-ortungsgeräte. (Antenna system for reflected beam position fixing equipments). German patent application T59611 VIII a/21a4 October 10, 1943 and still pending. Original inventor: Dr. Gundert. 1943. 4 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 10846. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Antennenanordnung für ultrakurze wellen. (Antenna arrangement for ultra short waves). German patent application T 59001 VIII a/21a4 applied Apr 17, 1943 still pending. Original inventor: Gerhard. 1943. 4 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9289. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Antennenanordnung zur erzeugung einer räumlichen leitlinie. (An antenna system for producing a spatial directrix). German patent application T59594 VIII a/21a4 Sep 28, 1943 still pending. Original inventors Dr. Buschbeck and Prost. 1943. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrations missing. Page 4 hardly readable.

PB 9258. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung nach DRP.....zur strahlschwenkung bei einem strahler mit hohlreflektor. (System according to German patent application.....to deflect the beam of a radiator with a concave reflector). German patent applied for Jan. 23, 1945, patent application still pending. Original inventor: Dr. Gerhard 1945.
Not illustrated.

PB 10865. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zur durchführung des verfahrens zur räumlichen peilung nach DRP 512/40. (Arrangement to carry out the procedure of special direction finding in addition to German patent application 512/40). German patent application T59064 applied May 11, 1943 still pending. Original inventor: Pleifer. 1943. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 10861. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zur erzeugung eines leitstrahles (Arrangement to produce a pilot beam). German patent application T59 060 VIIIa 21a4 May 6, 1943 and still pending original inventor: Dr Runge. 1943. 4 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 12203. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zur Strahlschwenkung bei einem Hohlrohrstrahler (An arrangement for beam deflection for a wave guide radiator). German patent application T60854 VIIIa/21a4 applied for Aug 23, 1944 and still pending. Original inventors: Gerhard and others. 1944. 4 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 10851. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Elektrische entladungerôhre, insbesondere ultrakurzwellenrôhre. (Electric discharge tubes, especially ultra short wave tubes). German patent application T 59018 VIII c/21g applied Apr 22, 1943 still pending; original inventor: Fischer. 1943. 8 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9295. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Entdämpfte röhrenanordnung für sehr kurze elektrische wellen. (Positive feedback tube arrangement for very short waves). German patent application T59628 VIII a/21a4 October 2, 1943 and still pending. Original inventor: Geiger. 1943. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 19592. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Flimmerpeiler (Spinner direction finder). German patent application T 56527 VIII a/21a4, Nov 25, 1941 still pending. Original inventor: Bussmann. 1941. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9283. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Hoch liegender vertikalstrahler für kurze wellen. (A high vertical antenna for short waves). German patent application T57287 VIIIa/21a4 Apr. 29, 1942 still pending. Original inventor: Dr. Buschbeck. 1942. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated. Partly hard readable.

PB 9287. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Schaltung zur modulation der frequenz eines schwingungserzeugers mittels einer blindwiderstanderöhre. (A circuit to modulate the frequency of an oscillator by means of a reactance tube). German patent application T57325 VIII a/21a4 May 1, 1942 still pending. Original inventor Dr. Lange. 1942. 8 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 10965. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Schaltungsanordnung zur ableitung von impulsen aus der rückfront gegebener rechteckiger impulse, bzw. aus der kurzen Flanke von sägezähnen. (Circuit arrangement for leading off of impulses from the front and the back of known square waves pulses, respectively from the short side of sawtooth waves) German patent applicable T60 063 VIIIe/21g applied Feb 12, 1944 and still pending; original inventor: Grasl. 1944. 4 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 10967. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Schaltungsanordnung zur erzeugung von impulsen mit konstantem verhältnis der impulsdauer zur impulspause bei verschiedenen impulsfrequenzen. (A circuit arrangement to produce pulses with constant proportion of the pulse width to the duty cycle at various repetition rates). German patent application T60 068 VIIIa VIIIa/21al, applied Feb 15, 1944 and still pending; original inventor: Oberbeck. 1944. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Drawing missing.

PB 10966. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Schaltungsanordnung zur herstellung von zwei oder mehr impulsen verschiedener dauer, aber zusammenfallender impulsmitten (A circuit arrangement to produce two or more pulses of various widths but coinciding pulse centers). German patent application T60067 VIIIa/21al applied Feb 15, 1944 and still pending. Original inventor: Dr. Grasl. 1944. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 10852. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Ultrakurzwellen-hohlraumschwinger. (Ultra short wave cavity oscillator). German patent application T59019 VIII c/21g applied Apr 22, 1943 and still pending; original inventor: Dr. Brühl. 1943. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9291. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Ultrakurzwellenmesseinrichtung. (Ultra short wave measuring device). German patent application T59621 VIII d/21e. Sep 30, 1943 still pending. Original inventors: Dr. Paul and Schütz. 1943. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrations missing.

PB 10856. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Ultrakurzwellen-schwingsanordnung. (Ultra short wave oscillator). German patent application T 59036 VIII a/21a4 applied Apr 29, 1943 and still pending; original inventor: Brück. 1943. 3 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9294. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verfahren zur herstellung des anodensystems einer schlitzmagnetronröhre. (Procedure for the manufacturing of a split-anode magnetron tube). German patent. Application T59627 VIIIe21g October 2, 1943 and still pending. Original inventor: Frömmel. 1943. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 10845. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verfahren zur resonanzkurvenmessung, vorzugsweise für ultrakurze wellen. (Arrangement to measure resonant curves, preferably for ultra short waves). German patent application T 59000 VIII a/21a4 applied Apr 20, 1943 still pending original inventor Dr. Brück. 1943. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9290. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Wirkwiderstand für hohe frequenzen. (Effective resistance for high frequencies). German patent application T59616 VIIIa/21a4 Sep 28, 1943 still pending. Original inventor Dr. Paul. 1943. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

United States

PB 19777. ALLISON, JOHN L. and others. Project 13-121, electrical direction finder evaluator: Final report. (OSRD Rept 6551). Oct 1945. 87 p. Price: Microfilm-$1.00 - Photostat-$6.00
This is a description, operating manual, and final report on the development of a device which, from the bearings to a radio transmitter measured by any number of fixed radio direction finders, determines by electro-mechanical means the following values: (a) the most probable location of the transmitter; and (b) the boundary of the smallest region in which, to any pre-assigned locality, the transmitter can be presumed to be located. The device was designed by personnel of Division 13, NDRC, and of the Applied Mathematics Group, Columbia University. The development was by J. A. Maurer, Inc. Appendices contain a statistical method for DF evaluation, sampling studies relative to operation of the evaluator, and considerations for its further development. Photographs, diagrams, and graphs are included.

PB 22178. RATEMAN, ROSS. Siting of VHF direction finders. (Sig Corps Rept CRC-P-3-2) Jun 1943. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
This report contains recommendations regarding the siting of VHF direction finders of the type furnished with SCS-2 and SCS-3 control net systems. It is intended to be used as a guide to siting personnel in the selection of sites for VHF direction finders. The recommendations apply particularly to the siting of direction finders in unfavorable terrain. Two sketches are included.

PB 22403. BOWEN, H. G. Report of progress - Problem W5-2S. Feb 1940. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
This report from the Naval Research Laboratory brings up to February 1940 the discussion of its pioneering experiments in radar equipment. The status of the program is outlined and recommendations for future development are made. These include improvement of 200 mc equipment, investigation at higher frequencies, improvement of auxiliary equipment, and recognition of friendly craft. Mention is also made of developments in this field in other laboratories.

PB 22407. COOLEY, H. M. Radio - Use of radio to detect enemy vessels and aircraft - Special report on (BuEng. Prob. W5-2S). Jun 1936. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
This 1936 report from the Naval Research Laboratory describes early research and problems in connection with the use of the pulse-echo method for detecting enemy vessels and aircraft. It records some of the first experiments in radar detection. Airplanes were located and "tracked" at distances up to 25 miles. A self-interrupting transmitting oscillator using a frequency of 28 mc and with a peak power of 3.5 kw was developed. A receiver and cathode ray oscilloscope capable of indicating the position of distant planes represented the pioneer steps in this field. A table, block diagram, and photographs of this equipment are included.

PB 22405. COOLEY, H. M. Radio ranging equipment - Special report on W5-2S. Feb 1938. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
A brief report is made by the Naval Research Laboratory on the present development status (1938) of echo ranging equipment with a view to possible incorporation of the equipment in new battleships. Developments were under way to reduce size and weight of the equipment. Performance permitted detection of metallic objects such as airplanes and of land formations at a distance as great as 40 miles.

PB 22179. CUTTING, FULTON. Polarization as an A. J. device. (Sig Corps Rept CRC-SS-2). Jul 1943. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
To avoid interference from a land based jammer it is proposed to use an aircraft radar in which the polarization of the transmitting and receiving antennas are at right angles to each other.

PB 22786. DINGER, HAROLD E. and PAINE, HAROLD G. Factors affecting the accuracy of radio noise meters. Feb 1946. 41 p. Price: Microfilm-50¢ - Photostat-$3.00
The factors which influence the accuracy of radio-noise measurements can be divided into two classes: (1) those affecting the accuracy of steady-state sine-wave radio-frequency measurements; and (2) those peculiar to the non-sinusoidal wave shapes of radio noise. Some of the factors can be controlled by suitable standardization of design specifications and methods of measurement, while other factors are dependent on the characteristics of the wave form and on the point at which it is to be measured. Probably the greatest measurement discrepancies can be attributed to differences in the wave collectors employed and to the variations in charge time "constant" of the metering circuit with differences in noise levels. Bibliography, graphs, and schematic diagrams are included. The report comes from the Naval Research Laboratory, Washington, D. C.

PB 19647. ELMORE, W. C. and others. Crystal clock project: Final report and Report on 10 KC L-C oscillator. (NDRC Rept 14:226). Jan 1944. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
This final report consists essentially of a descriptive summary of five earlier reports which have contained detailed information concerning the project. Part I deals with the development of a highly stable crystal oscillator for use at Loran transmitting stations whose function is essentially that of a clock. Part II discusses the design of a stable 10 KC L-C oscillator for possible application in the Loran receiver. Circuit diagrams and graphs are included in the report, a project of the Bartol Research Foundation of Franklin Institute, Swarthmore, Pa.

PB 19646. ELMORE, W. C. and others. Third report on crystal clock project. (NDRC Rept 14: 145). May 1943. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
This report covers research done on the development of a crystal oscillator for use in the Loran system. It contains: (1) discussion of theory and design of thermostat for the crystal; (2) discussion of Meacham type oscillator when used with an R-C amplifier; and (3) discussion of Meacham type oscillator when used with a tuned amplifier. In parts (2) and (3) the element controlling the frequency consists of a General Radio 50 kc bar crystal in its regular mounting, with its temperature controlled by means of the thermostat described in (1). Circuit diagrams are included. Later developments are reported in PB 19645, PB 19644, and PB 19647.

PB 19645. ELMORE, W. C. and others. Fourth report on the crystal clock project; and Preliminary report on 10 KC oscillator. (NDRC Rept 14:175). Aug 1943. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
Part I of this report covers the work done from May to August, 1943, on the development of a highly stable crystal oscillator. Part II describes the early stages of development of a stable 10 KC L-C oscillator. Both oscillators have applications in the Loran system, the 10 KC oscillator being suggested for use in the receiver to replace the 100 KW unthermostatted crystal. The report contains circuit diagrams. The work was done at Bartol Research Foundation of Franklin Institute.

PB 19644. ELMORE, W. C. and others. Fifth report on the crystal clock project; and Report on 10 KC L-C oscillator. (NDRC Rept 14: 193). Oct 1943. 37 p. Price: Microfilm-50¢ - Photostat-$3.00
The report consists of two parts: (1) A section dealing with the performance of the General Radio thermostat and its influence on oscillator stability; and (2) a section devoted to the further development of a 10 kc L-C oscillator whose stability is limited principally by the temperature coefficient of the tank circuit. The period covered by this progress report is August to October 1943 and the work was done at Bartol Research Foundation of Franklin Institute in connection with research on Loran oscillators. Graphs and diagrams are included.

PB 20247. ESTERMANN, I. and KIRKLAND, G. I. Aging of KCl crystals and screens under electron bombardment. (NDRC Rept 14:302) Feb 1945. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
It was observed that under exposure with a continuous signal of more than 5μa beam circuit, the darkening produced on a KCl crystal goes through a maximum and decreases again. With higher beam currents this effect becomes more pronounced and the crystal will finally become colorless. Similar but much smaller effects were observed with KCl screens with beam currents of more than 50μa. After long exposure, the darkening reaches an apparent minimum and increases from there on, but this effect is not produced by coloring but by a roughening of the surface. Repeated darkening and bleaching of crystals reduce the obtainable maximum darkening. No such effect was observed in screens. Four graphs are included. The study was made at Carnegie Institute of Technology.

PB 19639. GENERAL ELECTRIC COMPANY. Two-megawatt transmitter for NDRC project #3. (NDRC Rept 14:92) Dec 1941. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes the transmitter, transmitter tube, tower, antenna, and station equipment developed, manufactured and installed as part of the long-range navigation project no. 3 of NDRC. The transmitting equipment consists of a high voltage rectifier, an oscillator, a keyer unit, a controlled panel, and an antenna. Schematic diagram and photographs are included.

PB 19778. HARRIS, LOUIS and others. Sputtered and evaporated thermopiles and studies of thin films of plastic materials: Final report. (OSRD Rept 4415) Mar 1943. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
This investigation was undertaken with the object of finding the conditions best suited for making sensitive radiation thermocouples. After improving the technique of making couples by sputtering of metals, a simpler method was developed, namely, by the sublimation and distillation of the metals. The backing material (cellulose nitrate) of the thermocouples has been improved, as well as the method of mounting the couples. A new type of evaporated thermopile for scanning problems is suggested. Further studies are necessary to make the new design successful. Another phase of this investigation was concerned with the development of methods for the preparation of thin films of plastic materials. The research was done under contract with Massachusetts Institute of Technology.

PB 19799. HOLABIRD SIGNAL DEPOT, BALTIMORE, MD. Ground-wave field intensities. (Radio Propagation Unit Tech Rept 3). Jul 1945. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
This report was prepared to show in graphical form the expected wave received field intensities of vertically polarized waves for frequencies from 0.1 to 300 mc, and the height gain factors which may be expected when the transmitting and receiving antennas are elevated above the earth. The curves shown in the report are based upon the theoretical calculations for transmission over three different types of intervening ground. The calculation of the curves was based upon the assumption of a smooth, spherical earth. No attempt has been made to take into consideration factors causing abnormal attenuation of the ground-wave field intensities for elevated antennas, the ground-wave is first determined for both transmitting and receiving antennas located on the earth's surface, and then a height gain factor is applied for the elevated antennas. The use of the height gain factors is limited to distances beyond certain minimum distances which are functions of the antenna heights, frequency, and the ground constants. 10 curves illustrate the report.

PB 19800. HOLABIRD SIGNAL DEPOT, BALTIMORE, MD. Radiation from antennas in the 1.5 to 20.0 megacycle band. (Radio Propagation Unit Tech Rept 2). Apr 1945. 64 p. Price: Microfilm-$1.00 - Photostat-$5.00
This report on the radiation from antennas in the 1.5 to 20.0 mc band has been prepared to improve the accuracy of calculations for sky-wave and ground-wave field strengths produced

by Army radio sets. The curves shown in the report are based upon theoretical computations and actual field measurements where available. The theoretical computations take into account the type of soil over which the antennas are erected and its effect on the ground reflection factor and antennas radiation resistance, as well as the separation of the space and surface waves radiated from the antennas to produce the sky-wave and ground wave respectively. The use of these curves will give a substantial improvement in the calculations of field strengths over any method which does not take these factors into account. Tables give comparisons of various antennas for a particular 600 mile circuit at different frequencies and times of day. 55 curves comprise the bulk of the report.

PB 20517. HUDSON, COLIN M. and SMITH, HERSCHEL. Armor piercing cores, studied in motion by means of high speed radiographs: First partial report. (Frankford Arsenal Ordnance Lab Rept 51). Sep 1940. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
Demonstrations and tests of the Westinghouse equipment for high speed radiographs, using 100-kv X-rays, were made to show that it could be moved about and that it could record the instantaneous position and shapes of bullets moving through lighter metal. The tests show that radiographs of bullets moving in aluminum are not difficult to obtain and indicate that development of high-speed radiography is feasible for use with steel, one inch thick or thicker. Circuit diagrams and photographs are included.

PB 19775. LICKLIDER, J. C. R. The effects of amplitude distortion upon the intelligibility of speech. (OSRD Rept 4217) Nov 1944. 78 p. Price: Microfilm-$1.00- Photostat-$6.00
To study the effects of amplitude distortion upon the intelligibility of speech, it is necessary (1) to distort speech by controlled amounts, using representative types of amplitude distortion, and (2) to measure the intelligibility of the distorted speech. For the work reported here, nonlinear electronic circuits were used to provide variations of three basic types of amplitude distortion. The nonlinear circuits were introduced into otherwise high-fidelity communication systems, and word articulation tests were conducted to determine the intelligibility of speech as a function of distortion. The report was prepared at Harvard University Psycho-Acoustic Laboratory. It contains a bibliography, graphs, and diagrams.

PB 18365. LINDSLEY, DONALD B. and others. A study of the Foxboro Trainer as a training device for learning to track by means of pip-matching. (OSRD Rept 3102; NDRC Applied Psychology Panel 62, Research Rept 5) Dec 1943. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
The Foxboro trainer (BC-968-A) is an individual training device for learning pip-matching tracking ability. It is an electronic-mechanical unit designed to feed synthetic target echoes into the indicator unit of SCR-268 radar equipment. The report can be summarized as follows: (1) It is demonstrated that this device can be used effectively to train oscilloscope operators in pip-matching, tracking ability; (2) a typical learning curve showed marked over-all improvement for men given 9 minutes of practice a day for 12 days; (3) under error score was reduced from an average of 720 on the first day of training to 242 on the twelfth day; (4) forty-three per cent of the over-all improvement was accomplished during the first four days of practice and 83 per cent was accomplished during first seven days; (5) the reliability of the trainer as a measuring instrument is satisfactory; (6) inter-day correlations of performance are not sufficiently high to warrant prediction of terminal performance from initial performance; (7) men trained in tracking on the actual SCR-268 equipment show a significant transfer of tracking ability to the trainer task; and (8) there is no transfer of tracking ability acquired trhough training in pip matching on the A-scan oscilloscope (SCR-268) to that required in tracking by keeping a hair-line to a gate on a J-type presentation (SCR-584). Curves and tables showing test results are included in the report.

PB 15319. MARCUS, P. M. The interaction of discontinuities on a transmission line. (MIT Radiation Lab Rept 930) Feb 1945. 59 p. Price: Microfilm-$1.00 - Photostat-$4.00
Formulas are derived which express the overall transmission and reflection coefficients of a series of any number of discontinuities on a transmission line in terms of these coefficients for the individual discontinuities which are completely arbitrary and arbitrarily spaced along the line. Special cases of the formulas are given for a number of common or useful representations of a discontinuity which is a linear reactive fourpole. The nature of these representations and their relations to the basic representation by the impedance matrix are given in detail. An analysis of the general transmission formula as a sum of multiply reflected travelling waves is given which provides a physical picture for the various terms in the formulas. Simple, compact formulas are given for the case of a repeated structure i.e., identical discontinuities at uniform spacing. One of these is applied to the design of filter charts for the rapid calculation and visualization of the transmission properties of repeated structures - particularly shunt elements - useful for certain types of filters. Charts and graphs are included.

PB 22177. NORTON, KENNETH A. and OMBERG, ARTHUR C. The maximum range of a radar set. (Sig Corps Rept CRC-R-9-1) Feb 1943. 61 p. Price: Microfilm-$1.00 - Photostat-$5.00
Formulas are derived which may be used to calculate the maximum range of a radar set. It is shown that this depends on twelve factors. A semi-empirical formula for the RI ("range index") of a given radar set is developed which makes possible the statement of a single value of maximum range. Calculation of the RI of several existing radar sets is made and found to be in good agreement with the actual range of the sets. Cosmic noise of interstellar origin probably has the effect of decreasing the range of a radar set. Consideration is also given to the affect of the ground on the maximum range of a radar set, and the "effective echoing areas" of various kinds of targets. The appendix has notes added in February 1946 on radar reflections from the moon and cosmic noise from the sun and the milky way. Diagrams, curves, and tables illustrate the report.

PB 22401. PAGE, R. M. Detection of enemy vessels and aircraft by radio, special report on (BuEng. Prob. W5-2S). Jan. 1937. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
This report from the Naval Research Laboratory covers progress made in the development of the pulse-echo method for detecting planes and ships in the period from June 1936 to February 1937. Improvements were made in the apparatus, and radiation at 50, 80 and 200 mc was successful. Good results were obtained on planes up to 38 miles. Various applications of the pulse technique for area protection, underwater supersonics, and communication are suggested. Photographs of equipment and signals received are included.

PB 22402. PAGE, ROBERT M. Model XAF radio ranging equipment - Engineer's report on service tests of. Apr 1939. 45 p. Price: Microfilm-50¢ - Photostat-$3.00
This report from the Naval Research Laboratory covers tests made at sea on the installation of radar equipment on the USS New York in January and February, 1939. It is of historic interest, being the first marine installation of radar equipment. Tests were made for a variety of applications, including range limits on various types of ships, comparison with optical instruments, ranging on other vessels and shore objects, following shells in flight, etc. Tactical tests in connection with fleet maneuvers were also carried out, such as defense against night destroyer attack, and detection and location of airplanes. In general, performance was excellent. The report is accompanied by a narrative summary entitled "Radar goes to sea". Graphs, plot patterns, and a wiring diagram are also included.

PB 20228. PEKERIS, C. L. Wave theoretical interpretation of propagation of ten centimeter and three centimeter waves in low level ocean ducts. Mar 1946. 42 p. Price: Microfilm-50¢ - Photostat-$3.00

The data on the transmission of 10 cm and 3 cm waves in low level ocean ducts obtained by the NRL expedition to Antigua, British West Indies, were analyzed by wave theory. Beyond the horizon, the 10 cm wave was found to propagate by the first normal mode with a theoretical decrement of 1 d.b./n. mile, as against an observed value of about 0.8 d.b./n. mile in the first 80 miles from transmitter. Beyond 80 miles the observed rate of attenuation dropped to 0.2 d.b./n. mile. The 3 cm wave was found to propagate below the horizon by the first and second modes, with theoretical decrements of zero and 0.5 d.b./n. mile respectively. The latter agrees with observed values at high elevations, but near the surface the observed rate of attenuation exceeds the theoretical value by about 0.3 d.b./n. mile. Coverage diagrams for the 3 cm and 10 cm waves are included.

PB 8330. PICKERING, W. H., and others. A new method for the precision measurement of wave guide discontinuities. (OSRD Report 317) 1944. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
This report describes a resonant cavity technique for the routine measurement of wave guide discontinuities. The system is believed to leave a precision about one order of magnitude greater than the conventional slotted section technique. Topics included are: the slotted section method, the cavity resonance method, description of the cavity system, graphical treatment of data, experimental procedure for a measurement, sources of error, and some results of the method. Photographs, diagrams, and charts are given. The work was done under contract by the California Institute of Technology. See also PB 8332.

PB 8332. PICKERING, W. H., and others. Precision measurement of wave guide discontinuities. (OSRD Report 460) 1945. 52 p. Price: Microfilm-$1.00 - Photostat-$4.00
The presence of an electrical discontinuity in a wave guide or transmission line can be described in terms of an equivalent circuit of the discontinuity, provided that observations are not made in its immediate vicinity. Although these circuits can be calculated in a few cases, the calculations are very tedious and many configurations have not yet been solved, even approximately. Therefore, it is necessary to determine the circuits experimentally. This project has been concerned with the precision measurement of the equivalent circuits of wires and corners in wave guide. A resonant cavity method for these measurements has been developed, the technique of which is simple and capable of high precision. Photographs, diagrams, and graphs are given. The work was done under contract at the California Institute of Technology. See also PB 8330.

PB 18341. PIERCE, J. R. and SAMUEL, A. L. 3 centimeter receiving tubes, final report. (NDRC Rept D1-106) Dec 31, 1941; rev Jun 22, 1942. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
The objects of this project were (1) the extension of knowledge concerning the electronic problems which arise at frequencies as high as 10,000 mc and (2) the development of specific receiving tubes for use in this frequency range. It was found that local oscillators for operation at 10,000 mc are practical and that the design of such tubes for manufacture and service use would be feasible. The most satisfactory results were obtained from the 1280 CT and the 1299XQ1 type tubes. The 1280 CT vacuum tube is an ultra-high frequency oscillator of the velocity variation type delivering 40 or more milliwatts of power in the 3 centimeter wave length range. The oscillator tube requires an external resonant cavity and requires an auxiliary field coil to give a magnetic field along the axis of the tube. In the 1299XQ reflection oscillator, the desirable features of low voltage operation and electronic tuning were realized at 10,000 mc. Photographs and schematic drawings are included. No worth while results were obtained on first detector tubes. Development was by the Bell Telephone Laboratories, Inc.

PB 17438. RCA MANUFACTURING COMPANY, INC. Model DF radio direction finder equipment, A-C operated - range: 100-1500 KC. Instructions. (Instruction Book 23905) Oct 1934. 76 p. Price: Microfilm-$1.00 - Photostat-$6.00
These instructions cover the installation, operation, and servicing of the Model DF direction finder equipment, which is designed for operation from 110 volt, 60 cycle, single phase service. The receiver is of the superheterodyne type having a frequency range of 100 to 1500 Kc., and when properly installed and calibrated will accurately indicate the direction of propagation of pure or modulated continuous wave signals (either keyed or unkeyed) at any frequency in the band. Photographs, outline and wiring diagrams, and schematic diagrams are attached. The equipment was manufactured for the Navy Department, Bureau of Engineering.

PB 22176. SMITH, CARL E. and JOHNSON, E. M. Performance of short antennas. (Sig Corps Rept OEM-P-22-1). Jan 1945. 43 p. Price: Microfilm-50¢ - Photostat-$3.00
The purpose of this paper is to present experimental data on the performance of vertical antennas having a physical height of less than one-eighth wavelength. These data cover many conditions of top loading performed on a 300-foot self-supporting, tapered, vertical tower with measurements of antenna resistance and reactance from 120 to 400 kc. For these conditions, field intensity measurements were made. The best results are obtained when adequate top loading is used in conjunction with a good ground system. This increases the value of the radiation resistance component and lowers the capacitive reactance component of the driving point impedance. The report contains curves, photographs, and a map showing location of measuring points.

PB 18072. SUBMARINE SIGNAL COMPANY, BOSTON, MASSACHUSETTS. Installation, operation and maintenance instructions for Model MM-16 echo sounding equipment. (Manufactured by Submarine Signal Company, Boston, Mass.). (Sub Sig Spec 8339) Nov 19, 1939. 115 p. Price: Microfilm-$1.50-Photostat-$8.00
Schematics, diagrams, and photographs illustrate this complete manual of instructions for the installation, operation and maintenance of the Model MM-16 echo sounding equipment. Tables list major parts and spare parts. This device indicated ocean depths in fathoms by producing a signal under water and measuring the length of time elapsing before the return of the echo from the ocean bottom. Operation is automatic in depths up to 4000 fathoms, and semi-automatic readings may be obtained beyond that depth. Major components of the equipment include an indicator-amplifier, driver-rectifier, polarizier-bias rectifier and loudspeaker as well as the projector.

PB 22404. SWENSON, L. K. Problem W5-2S - Special report on. Aug 1938. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
The state of development of the Naval Research Laboratory project on pulse-echo detection of vessels and aircraft by radio is reported as of August 1938. A complete system operating at 200 mc had been in continuous operation since January 1938, indicating position of aircraft near or above the horizon at distances out to 60 miles. Development of equipment for shipboard installation was underway, and numerous refinements were in progress. Photographs of equipment and pulse readings are included.

PB 17343. TAYLOR, A. H. A single-stroke sweep operating from center position. Feb 1946. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
Because common types of single-stroke sweep require a cathode-ray oscillograph deflection amplifier to deliver twice the peak output voltage necessary with sinusoidal or sawtooth deflection, overloading and consequent nonlinearity are probable. A very fast single-shot sweep circuit is described which avoids this difficulty. Starting from screen center, it jerks to the left edge and commences sweeping within 0.1 microsecond after tripping, and simultaneously flashes on the normally extinguished cathode-ray beam just long enough for the spot to traverse the width of the screen. Applications both as a sweep for very fast transient studies and as a high-speed chronograph are discussed. Theory of operation and design equations are derived. The circuit of a typical sweep-chronograph is given and valves of all components listed.

PB 19724. U. S. ARMY TECHNICAL INTELLIGENCE CENTER, TOKYO. Enemy material signal: Type 3 MK 1 detector, temporary designation. (Rept 52). Aug 1945. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
This equipment was captured in the Visayan group, Philippine Islands, in April, 1945. It is presumed to be the receiving unit of a supersonic detector, used for the detection of water craft. Presumably there is also a transmitter or oscillator which sends out supersonic waves or pulses through some radiating device. The detector, through some directional receiving mechanism or loop, picks up the reflected waves and measures the time interval, thus locating the detected craft. The detector as found is made up of two units, called the "Indicator" and "Amplifier." Precautions are taken to minimize the pickup of unwanted vibrations of waves. Frames, panels, and covers are made of aluminum. Construction is of average quality. Circuit description is given for the amplifier and the indicator. Photographs and schematic diagrams are given for the equipment and its parts.

PB 20815. U. S. NAVY DEPARTMENT. BUREAU OF AERONAUTICS. Handbook of operating instructions for Navy model AIA aircraft radar equipment. (NAVAER 08-5S-16; Sperry Instruction 23-152) Jul 1943. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
This manual contains instructions for installation and operation of this aircraft radar equipment. Assembly and outline diagrams are included.

PB 18070. U. S. NAVY DEPARTMENT. BUREAU OF ENGINEERING. Installation, operation and maintenance instructions for Model QC-6 and Model QC-6A echo ranging equipments and Model HD hoist-train equipment. (Manufactured by Submarine Signal Co., Boston, Mass.) (Sub Sig Spec 8436; Su Eng Spec 55EE78A1213A) Oct 1936. 236 p. Price: Microfilm-$2.50 - Photostat-$16.00
The echo ranging equipment described in this volume are devices for obtaining the distance and direction of a vessel, etc., by producing a signal on the vessel equipped with the equipment and noting the time required for the echo to return and the direction from which the echo returns. The sound produced, which serves also as a receiver of the echoes, is a magnetostrictive projector or transceiver operating at a nominal frequency of 18 or 24 kilocycles. Determination of the bearing of the distant object depends upon the directional characteristics of the projector, which emits a narrow beam of sound. The purpose of the hoist-train equipment is to lower the projector from a sea chest within the ship's hull to a point 20 inches below the base line of the ship, to rotate the projector for sounding purposes and to hoist the projector back into the sea chest. This manual gives detailed instruction as to operation, installation and maintenance of the equipment. Parts lists, photographs, schematics, wiring diagrams and drawings are included.

PB 18054. U. S. NAVY DEPARTMENT. BUREAU OF ENGINEERING. Model TAF-2, 1-KW output radio telegraph transmitting equipment. (Manufactured by General Electric Company) (GEI-5481) 1931. 132 p. Price: Microfilm-$1.50 - Photostat-$9.00
The Model TAF-2 transmitting equipment is designed primarily for service on vessels where a compact, medium power, high-frequency transmitter is required. The transmitter is designed to provide continuous wave telegraphic operation on any frequency in the following four bands: 4000-4525 kc, 8000-9050 kc, 12000-13575 kc, 16000-18100 kc. The transmitter will deliver 1 kw of power on any of the aforementioned bands. The manual contains instruction on the installation, operation and adjustment of the component parts. Parts lists, curves, photographs, schematics and wiring diagrams are included.

PB 20229. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Catalogue of electron tube types used by the Navy. (NAVSHIPS 900,075) Jan 1945. 50 p. Price: Microfilm-50¢ - Photostat-$4.00

PB 20238. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Elements of electricity and radio; 1st edition. (NAVSHIPS 900,012). Apr 1944. 206 p. Price: Microfilm-$2.50-Photostat-$14.00
An elementary treatment of electrical circuit theory is presented in this publication, which was prepared for the use of Naval enlisted personnel performing radio and radar duties. Fundamental information on direct and alternating currents, magnetic circuits, vacuum tubes, antennas, and frequencies is outlined. Appendices describe connecting and soldering, interpretation of oscilloscope patterns, and commonly used tables and charts. Functional diagrams and graphs are included.

PB 20810. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Handbook of maintenance instructions for AS-205/APS-4 aircraft radar equipment. (CO-NAVAER 08-5S-154). Feb 1945, rev Jul 1945. 41 p. Price: Microfilm-50¢ - Photostat-$3.00
The AS-205/APS-4 is an antenna used with the AN/APS-4 search type radar operating in the X-band. It consists of a feed horn mounted at the end of a section of wave-guide and equipped with a parabolic reflector. The antennas scan through 150 degrees in azimuth and it can be tilted vertically to any position between 10 degrees above and 30 degrees below the horizontal axis of the aircraft. Two-line scanning and four-line scanning are provided. The antenna is designed to operate under temperatures from minus 22 degrees to plus 122 degrees F., and at elevations up to 30,000 feet. This manual contains operation and maintenance instructions, parts list, photographs, drawings, and schematics.

PB 20813. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Handbook of maintenance instructions for model AN/APS-3 aircraft radar equipment with addendum no. 2 covering antenna unit AS-22/APS-3 and modulator unit MD-5B/APS-3. (CO-AN 08-5LA-1). Nov 1943, rev Jul 1944. 310 p. Price: Microfilm-$3.50 - Photostat-$21.00
The AN/APS-3 radar equipment is designed for installation in aircraft for use primarily in locating surface vessels and aircraft. The transmitter frequency is 9375 mc. This handbook contains sections on general description, installation and adjustments, operation, mechanical and electrical characteristics, maintenance, and supplementary data. It is illustrated with photographs, diagrams, and tables.

PB 20818. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Handbook of maintenance instructions for Navy model ASC and ASC-1 aircraft radar equipment. (CO-NAVAER 08-5S-58; NEC 152A). Jan 1942. 331 p. Price: Microfilm-$3.50 - Photostat-$23.00
This equipment was designed to be used aboard aircraft primarily for the detection of surface vessels. It is equipped to provide radar operation on ranges of 4, 20, 50, and 100 nautical miles. It is also equipped to provide beacon operation for homing and navigation on the above ranges. It will operate satisfactorily up to an altitude of 15,000 feet above sea level at temperature ranges of -40 to +55°C. The manual contains sections on general description, installation and adjustment, operation, mechanical and electrical characteristics, maintenance, supplementary data on test equipment, and table of replaceable parts. Photographs and simplified schematics are provided. The manufacturer is Western Electric Company, Inc.

PB 18091. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Installation instructions for transmitter keying kit (MI-18180) for models SD-a, SD-1, SD-2, SD-4 radar equipments, field change SD(9) (manufactured by RCA, Victor Div., Camden, N. J.). (IB-38328) 1944. 5 p.
Price: Microfilm-50¢ - Photostat-$1.00
The purpose of this kit is to provide means for keying the type CRV-52AAY/CRV-52AAY-1 radar transmitters of the subject equipment by the installation of the keying switch and new circuit breaker provided in the kit. Manual includes installation and operating instructions for the kit.

PB 19950. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instructional radar diagrams, no. 2 of a series, SA. (NAVSHIPS 903-6) Feb 1944. 43 p. Price: Microfilm-50¢ - Photostat-$3.00
This booklet of SA radar diagrams is intended primarily for use as a student's notebook in training schools for radar material men. It may also be of aid in locating sources of trouble in circuits. Circuit, schematic, and block diagrams are included together with photographs and tuning instructions.

PB 19953. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instructional radar diagrams no. 3, SC/SK series. (NAVSHIPS 903-9) Apr 1944. 48 p. Price: Microfilm-50¢ - Photostat-$4.00
This booklet of diagrams of SC/SK radars was prepared principally by Radar Maintenance School, Navy 128. It is intended primarily as a notebook in training radar personnel and may also be used in locating faulty components in radar circuits. In addition to schematic, wiring, and block diagrams, the report contains photographs of the equipment.

PB 19960. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instructional radar diagrams no. 4, SF/SF-1. (NAVSHIPS 900,049) Jul 1944. 42 p. Price: Microfilm-50¢ - Photostat-$3.00
This pamphlet is intended primarily to assist technicians in the field in locating faulty components after the defective circuit has been isolated. It consists of 39 illustrations comprising photographs, functional, wiring, and schematic diagrams.

PB 20816. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for Navy model ARD, ARD-1, ARD-2, ARD-3, ARE and ARE-1 radio equipment. (CO-NAVAER 08-5S-30; ENG 166) Feb 1942. 174 p. Price: Microfilm-$2.00 - Photostat-$12.00
This airborne equipment consists of two main units - a radio receiver and a control unit. The circuit of the receiver consists essentially of two super-regenerative circuits. The frequency range for the ARD equipment is 38 to 52 mc and 175 to 225 mc, and for the ARE equipment. 100 to 116 mc and 175 to 225 mc. Maintenance tests, installation instructions, vacuum tube data, and parts lists are given in the text. Photographs and schematic diagrams are included. No mention is made of the use of this equipment, although it appears to have been designed for IFF purposes.

PB 20809. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for RA (Navy model ASVC) aircraft radar equipment. (CO-NAVAER 08-5S-64; ENG 145A; Research Enterprises Limited Pub 171-009). Jun 1941. 132 p. Price: Microfilm-$1.50 - Photostat-$9.00
The RCA equipment described in the report is installed in aircraft for the purpose of detecting and locating objects on the surface of the sea. The equipment consists of a power supply, transmitter, receiver, and one, or in some cases two, indicator units. The equipment may also be used for determining the direction of an object and for homing purposes. The transmitter has a frequency of 176 mc. The book is divided into four sections: General description; constructional details; theory of operation; adjustment and maintenance. There is an appendix on the polyplexer antenna switching unit. Photographs and diagrams are included. The equipment was manufactured by Research Enterprises Ltd., Toronto, Canada.

PB 20234. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instructions for the operation of SA radar. (NAVSHIPS 900,021) Apr 1944. 28 p. Price: Microfilm-50¢ Photostat-$2.00
This pamphlet contains pictorial and graphical information on the operation and maintenance of the Navy model SA radar, intended primarily for aircraft search. The compilation was made by RCA Service Company, Inc.

PB 20232. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instructions for the operation of SA2-PPI radar with the JF receiver. (NAVSHIPS 900,050) Aug 1944. 81 p. Price: Microfilm-$1.00 - Photostat-$6.00
This pictorial and graphic pamphlet was prepared to aid the training of operators of the subject equipment for aircraft search and target recognition. The publication was prepared by RCA Service Company, Inc.

PB 20233. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instructions for the operation of SF/SF-1 radars. (NAVSHIPS 900,029) Jul 1944. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
SF/SF-1 radars are compact, medium power, surface search equipments. They are installed on submarine chasers, patrol craft, minesweepers, and other vessels of comparable size. Their function is to indicate the presence, range, and bearing of surrounding ships, low flying aircraft, land, and other objects capable of reflecting radar energy. They utilize both A and PPI presentation, on separate screens. This book describes basic operating procedures which apply to both the SF and SF-1 radars. Photographs and drawings are included.

PB 20237. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instructions for the operation of SO series of radars. (NAVSHIPS 900,014) Jun 1944. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
The SO series radars are low-power, light-weight, compact detection and ranging equipments designed to meet the specific requirements of PT boats and other small vessels. The principal units are the power supply, transmitter-receiver, antenna assembly, the plan position indicator, and accessory units. Brief operating instructions are provided in this handbook, designed to supplement a training film. It is illustrated with photographs.

PB 19951. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Maintenance manual for JP-1, JP-2, JP-3, sonar equipment. (NAVSHIPS 900,043) n. d. 86 p. Price: Microfilm-$1.00 - Photostat-$6.00
The JP-series of sonar apparatus is "sonic" in that it works in the region of frequencies (100-12,000 cps) to which the human ear is responsive. The apparatus consists of a hydrophone which picks up audible sounds in the water and converts them to electric voltages, plus an amplifier, headphones, loudspeaker, and other components. The hydrophone is located well forward on the main deck of the submarine, and is rotatable about its center in a horizontal plane. The sonarman can determine the sounds present in the same region in which the submarine is operating, and the bearing of the sounds with respect to his own ship. This manual contains operating and maintenance instructions and is profusely illustrated with photographs, drawings, and diagrams.

PB 19961. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Loran handbook for shipboard operators. (NAVSHIPS 278). Jan 1945. 74 p. Price: Microfilm-$1.00 - Photostat-$5.00
The principles and practice of operation of Loran equipment are explained in nontechnical language. The appendix describes the operation of Navy models DAS-1 and DAS-3 and NDRC model LRN-1A Loran shipboard equipment. Photographs, drawings, and graphs are included.

PB 20240. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. The Klystron. (NAVSHIPS 903-7). Apr 1944. 47 p. Price: Microfilm-50¢ - Photostat-$4.00
The term Klystron is applicable to an ultra-high-frequency amplifier or generator which combines the bunching principle, i.e., velocity modulation and drift distance, with one or more cavity resonators to produce and to utilize a velocity modulated beam of electrons. This manual contains chapters on Klystron construction, theory of Klystron operation, Klystron operation, and wave length and frequency measurement. Diagrams, curves, and a glossary are included.

PB 19955. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Maintenance manual for QBE, QBE-1, QBE-3, QBE-3a sonar equipment. (NAVSHIPS 900,415) 1945. 289 p. Price: Microfilm-$3.00 - Photostat-$20.00

The units of the QBE-series of equipments are designed for installation in small, fast anti-submarine vessels. The major units are receiver-amplifier, indicator, driver-rectifier, projector (with Rochelle salt crystals), hoist-lower gear, training mechanism, motor generator, and miscellaneous equipment. The equipment is used for echo ranging, communication, and sounding. This manual contains installation, operation, and maintenance instructions and is profusely illustrated with photographs, drawings, and diagrams.

PB 19958. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Maintenance manual for QCQ-2 sonar equipment. (NAVSHIPS 900,046). n.d. 280 p. Price: Microfilm-$3.00 - Photostat-$19.00
The QCQ-2 sonar equipment is used for echo ranging and listening for under-water sounds. A QC (magnetostrictive type) projector is incorporated in the equipment. The major units are described, and operation and maintenance instructions are given. Numerous illustrations are provided, including photographs, drawings, and diagrams.

PB 19956. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Maintenance manual for QCS, QCS-1, QCT, QCT-1, QCQ-1, QCH-1 sonar equipment. (NAVSHIPS 900,026) n. d. 268 p. Price: Microfilm-$3.00 - Photostat-$18.00
The shipboard sonar equipment, for which this manual provides operation and maintenance instructions, performs sounding, listening, and echo ranging functions. The projector is made in two sections, JK (crystal) and QC (magnetostriction). There are numerous diagrams, photographs, and sketches.

PB 19957. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Maintenance manual for WCA, WCA-1 sonar equipment. (NAVSHIPS 900,045). n.d. 468 p. Price: Microfilm-$5.00 - Photostat-$32.00
The equipments for submarine installation described in this manual are designed to perform all the basic sonar functions - sounding, echo ranging, listening, and communication. The WCA/WCA-1 equipments consist of a combination of three individual systems. One system is a QC-JK echo-ranging and listening unit, characterized by a combination projector including a magnetostriction element and a Rochelle salt listening element. A second echo-ranging and listening system called a QB unit, has a Rochelle salt projector providing for a wider range of frequencies than that permitted by the QC system. The third system employs a fixed magnetostriction sounding projector and is used solely for sounding. This system is often called the "MH" system. The systems may be used interdependently. This manual contains operation and maintenance instructions and is profusely illustrated with photographs, drawings, and diagrams.

PB 19952. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Maintenance manual for WEA-2, WEA-2A sonar equipment. (NAVSHIPS 900,042) 1945. 292 p. Price: Microfilm-$3.00 - Photostat-$20.00
The units of WEA-2/WEA-2a equipments are designed for installation in the small, fast anti-submarine vessels. The installation is used for listening, communicating, sounding, and echo ranging. The projector consists of a QC (magnetostriction) section mounted back-to-back with a JK (Rochelle salt crystal) section. Other units include a receiver-amplifier, indicator, driver-control, hoist-lower unit, remote training control, motor-generator, and magnetic controller. This manual contains sections on description, installation, operation, and maintenance. It is profusely illustrated with photographs, drawings, and diagrams.

PB 20241. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Microwaves and wave guides. (NAVSHIPS 903-S) Feb 1944. 58 p. Price: Microfilm-$1.00 - Photostat-$4.00
The text material of this reference work has been selected to give a nonmathematical and simplified introduction to the subjects of microwaves and wave guides. Outline drawings and diagrams are included.

PB 20817. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Operating manual for Navy model ABD, ABD-1, ABD-2, ABD-3, ABE, ABE-1 and ABE-2 radio equipment. (NAVAER 08-5S-99) Feb 1942. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
Instructions are given for ground inspection, inspection before flight and procedure in air for this aircraft equipment. Sketches of accessories and test equipment are included. The equipment was manufactured by the Philco Corporation. The use of the equipment is not mentioned in the manual, but it appears to have been designed for IFF purposes.

PB 18042. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Preliminary instruction book for Navy model SU-1, radar equipment. (Manufactured by Submarine Signal Company, Boston, Mass.) (Sub Sig Spec 9105) n. d. 109 p. Price: Microfilm-$1.50 - Photostat-$8.00
The Navy model SU-1 radar equipment is designed for use on shipboard, and is used to detect the presence of objects and determine their distance and bearing with respect to the ship. The range information is obtained by sending out pulses of ultra-high frequency radio energy and measuring the time required for the reception of echoes. The echoes can only be received from targets which lie in the direction the antenna is pointed; the angular position of the signals on the PPI shows the position of the antenna. This manual gives instruction in the installation, maintenance and operation of the equipment. Tables of parts, drawings, schematic and connection wiring diagrams are also included.

PB 20236. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Radar electronic fundamentals. (NAVSHIPS 900,016) Jun 1944. 477 p. Price:Microfilm-$5.00 - Photostat-$32.00
This text has been written for the purpose of providing the student technician with an understanding of basic circuits which are the components of more complex radar circuits. It is assumed that he possesses a rudimentary knowledge of magnetism and electricity and the basic principles of radio. The review of electrical fundamentals is provided in section II followed in section III by an introduction to the characteristics of nonsinusoidal waves and transients. Sections IV, V, and VI provide a brief discussion of vacuum tube types and performance, amplifier, oscillator, and power-supply circuits. Emphasis is placed on the circuits which find extensive application in radar. Sections VII through XIII are devoted to the analysis of circuits and circuit elements which form the basic components of radar equipment. Explanations throughout the text are as nearly nonmathematical as possible. A glossary of terms is provided in the appendix.

PB 20235. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Radar system fundamentals. (NAVSHIPS 900,017) Apr 1944. 399 p. Price: Microfilm-$4.00 - Photostat-$27.00
This text has been prepared for the purpose of providing the student technician with an understanding of typical radar circuits. The six functional components in the form of blocks, common to all radar sets, are introduced, and their inter-relationship is established. Actual circuits are then substituted for the functional blocks to present two complete equipments: one very simple long-wave set, followed by a representative microwave set. Six sections are then devoted to the development of more highly refined circuits for improving the performance of the six basic functional components previously described. An additional section is provided in which the principles of servo mechanisms are presented. The majority of circuits discussed in this text were extracted from various production equipments and in many cases were simplified in order to stress the fundamental operation. Particular reliance is placed on TM 11-466 and Navships 900,016 for the basic analysis of individual circuits composing the more complex radar circuits. Mathematical considerations have been reduced to a minimum. A glossary of radar terms is provided in the appendix.

PB 20239. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Radio-frequency transmission lines. (NAVSHIPS 900,008). May 1944. 47 p. Price: Microfilm-50¢ - Photostat-$4.00

This instruction manual for Naval radio personnel discusses radio-frequency transmission lines, the problems peculiar to them, their characteristics and design, their physical construction, and their uses and applications. Schematic diagrams, outline drawings, and graphs are included.

PB 20230. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. VF operation. (NAVSHIPS 900,076) n.d. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
This pamphlet provides simplified operating instructions on the model VF precision PPI equipment. The VF is designed for use with various types of search radar equipment, its function being to repeat and retransmit the target bearing provided by any selected search radar, and to measure and transmit the accurate range of a target. The instructions are in the form of drawings and other graphic data.

PB 22018. U. S. WAR DEPARTMENT. Antenna equipment RC-83. (Tech Manual 11-2616). Oct 17, 1944. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
This manual contains installation and maintenance instructions for a vertically polarized directional antenna, which is used with, but is not part of, various radio sets. The antenna consists of a 100-foot antenna wire erected over a single 30-foot mast, and an 85-foot counterpoise wire laid along the ground. Photographs and drawings are included.

PB 21895. U. S. WAR DEPARTMENT. Antenna mast AB-54/FR. (Tech Manual 11-2638). Nov 1944. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
This manual describes the installation and maintenance of the antenna mast AB-54/FR, a 90-foot, hexagonal, plywood, sectional mast. It is used to suspend half-rhombic and coaxial antennas in the field. Photographs and drawings illustrate the manual.

PB 22204. U. S. WAR DEPARTMENT. Frequency standard TS-308/U. (Tech Manual 11-2630). Dec 1944. 41 p. Price: Microfilm-50¢ - Photostat-$3.00
This is a fully shielded electronic instrument consisting of an accurate 100-kc standard frequency crystal oscillator and a dual frequency multivibrator. The frequency standard delivers fundamental frequencies of 10, 50, and 100 kc. Harmonics of the fundamental provide a source of highly accurate output frequencies in 10-kc steps, starting at 10 kc, as a means for measuring unknown frequencies over a wide range. The manual contains sections on description, installation and operation, functioning of parts, maintenance, and supplementary data. There are photographs and a schematic diagram.

PB 22014. U. S. WAR DEPARTMENT. Radio set SCR-255 (direction finding). (Tech Manual 11-861) Aug 28, 1942. 100 p. Price: Microfilm-$1.00 - Photostat-$7.00
This operating and maintenance manual covers a semi-portable, ground-station radio direction finder covering the frequency range of 550 kc to 30 mc. It is designed to operate as an aural null direction finder employing a rotating Adcock antenna system. Parts lists, dimensional drawings, photographs, and diagrams are included. The manual was published by Wilcox-Gay Corporation.

PB 21918. U. S. WAR DEPARTMENT. Radio set SCR-502. (Tech Manual 11-256). Jan 1945. 180 p. Price: Microfilm-$2.00 - Photostat-$12.00
Radio set SCR-502 is a semiportable radio direction finder (RDF), designed for ground station operation. The frequency range is from 1.5 to 30 mc, using two fixed U-Adcock antenna arrays. Instantaneous visual azimuths are indicated on the screen of a 5-inch cathode-ray tube by means of deflection coils driven in synchronism with the motor-driven goniometer. Provision is made for simultaneous aural monitoring of the received signal. Azimuths may be read directly from the illuminated 360° azimuth scale, for both cw and an signals. The manual contains sections on description, installation and operation, functioning of parts, maintenance, and supplementary data. It is illustrated with photographs, drawings, and diagrams.

PB 22214. U. S. WAR DEPARTMENT. Radio set SCR-556-A. (Tech Manual 11-251). Sep 1944. 155 p. Price: Microfilm-$2.00 - Photostat-$11.00
This equipment is a self-contained, semiportable, ground, radio direction finder station. The equipment has a frequency range of 18 to 65 mc, covered in two bands, and provides for the reception of amplitude-modulated or continuous-wave signals. The RDF can be used to determine the direction of radio transmitters located on the ground or in aircraft. A rotatable adcock antenna is used and signal nulls are indicated both visually and aurally. The manual has sections on description, installation and operation, functioning of parts, maintenance, and supplementary data. There are photographs, sketches, schematic and wiring diagrams.

PB 22011. U. S. WAR DEPARTMENT. Rectifier power unit PP-108/TG. (Tech Manual 11-968) Jan 10, 1945. 39 p. Price: Microfilm-50¢ - Photostat-$3.00
This is a reactance-controlled tube rectifier, designed to supply d-c power for the operation of telegraph printing equipment. Conversion of a-c line current to d-c is accomplished by 6 half-wave gas-filled rectifier tubes which are automatically controlled by a regulating circuit. The equipment consists of 5 principal assemblies: meter section, control section, transformer section, regulator section, and filter section. The unit operates from a 3-phase, 230-volt, 60-cycle line. The 60-cycle frequency may vary between the limits of 55-65 cycles, and the voltage may vary from 210 to 250. Instructions are given for the installation, operation, maintenance and repair of the unit and its components. Photographs, diagrams, tables, and a parts list are included.

PB 22221. U. S. WAR DEPARTMENT. Sound ranging set GR-3-C. (Tech Manual 11-444) Jun 1943. 75 p. Price: Microfilm-$1.00 - Photostat-$5.00
Sound ranging set GR-3-C is designed to detect the sound of artillery fire or shell detonation and record the difference in arrival time of the sound wave at a maximum of eight microphone locations. The microphones may be placed in various geometrical configurations at intervals up to a maximum of 2,000 yards. The signal detected by each microphone is locally amplified and transmitted over wire lines to a central station where it is recorded photographically by an oscillograph. The manual contains sections on description, installation and operation, functioning of parts, maintenance, and supplementary data. Photographs and diagrams are included.

PB 21905. U. S. WAR DEPARTMENT. Sweep generator MI-18709-B. (Tech Manual 11-1065). Feb 1944. 31 p. Price: Microfilm-50¢ - Photostat-$3.00
The complete H-F sweep generator is designed to be operated in conjunction with an oscilloscope for the alignment of wide band r-f or i-f stages (500 kc or wider at 70% response) which are within the frequency range of 5 to 65 mc. It consists of a s-f sweep generator and a rectifier power unit, interconnected by a plug-in cable. The manual contains description, installation, operation and maintenance instructions, and list of replaceable parts. Photographs and schematic diagrams are included.

PB 22203. U. S. WAR DEPARTMENT. Training generator AN/URA-TI. (Tech Manual 11-2609). Jun 1944. 63 p. Price: Microfilm-$1.00 - Photostat-$5.00
This is a device which provides several types of electrical interference encountered by a radio operator in receiving messages. In field training it may be used to modulate a standard radio transmitter, familiarizing operators in a net with several types of interference which may be encountered under combat conditions. Three types of interference are produced: tones, noise, and random keying. The main component is a modulator unit. Photographs and diagrams accompany this instruction manual.

PB 21967. U. S. WAR DEPARTMENT. SIGNAL CORPS. Radio beacon equipment RC-163. (Tech Manual 11-2609). May 1944. 106 p. Price: Microfilm-$1.50 - Photostat-$8.00

This manual covers installation, operation, functioning of parts and maintenance of this auxiliary equipment designed to provide a method for radio receiver-equipped units to locate themselves in unfamiliar terrain. It consists essentially of a rotating directional antenna synchronized to an automatic code keyer and is designed for ready connection to Radio Sets SCR-508(8) or SCR-608-(8), etc. It is designed to operate at a frequency of 20 to 39 mc. A transmitter may be converted to a beacon station by substituting the beacon equipment for the standard whip antenna. Parts list, photographs, cording, and schematic diagrams are included.

PB 21941. U. S. WAR DEPARTMENT. SIGNAL CORPS. Rectifier RA-34-H. (Tech Manual 11-961) Nov 1943. 81 p. Price: Microfilm-$1.00 - Photostat-$6.00
This is a power supply for operation of Radio Transmitter BC-191, part of Radio Set SCR-188. It is intended for indoor or field use and operates from a suitable power source of 105-125 volts, or 210-250 volts, 50-60 cycles alternating current. It supplies plate voltage, 12 volts alternating current (filament), for the transmitter, and 12 volts direct current for control and microphone operation. Installation and operation, functioning of parts and maintenance are covered. Parts list, photographs, drawings, cording, functional, schematic, circuit, and wiring diagrams are included.

PB 21962. U. S. WAR DEPARTMENT. SIGNAL CORPS. Vibrator pack PP-68/U. (Tech Manual 11-2648) Jan 1945. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
This manual includes operating instructions, preventive maintenance, and repair instructions for this portable, vibrator type power supply. It operates with a 6- or 12-volt storage battery source and supplies 110-volt, 60-cycle alternating current to Tube-Tester I-177 which is a part of Test Set I-56 K. Output voltage is 105 to 115 volts for loads of 15 to 50 watts. It may be used with other test equipment. Parts list, photographs, functional, schematic and circuit diagrams are included.

PB 20824 U. S. WAR DEPARTMENT. SIGNAL CORPS. PICTORIAL ENGINEERING AND RESEARCH LABORATORY, LONG ISLAND CITY, N. Y. Drawing: Camera, PH 562/PPN rectifier power unit PP-237 ()/TPQ-6 schematic and circuit label. Jan 1946. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
A schematic diagram of the subject rectifier power unit.

PB 20811. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for model AN/APN-7 radar transpondor beacon. (AN 16-30APN7-3). Feb 1944. 135 p. Price: Microfilm-$1.50 - Photostat-$9.00
The purpose of this handbook is to give the installation, operation, service, and maintenance procedure for the air-borne radar transpondor beacon AN/APN-7. It is designed for installation in heavier-than-air aircraft. Its purpose is to establish the identity of the aircraft in which it is installed. Ultra-high frequency pulses, which set its circuits into operation, are received from radar equipment. The pulses transmitted by the radar transpondor beacon are different in duration and amplitude from those received, but they key in with the radar equipment. To insure more positive identification, provision is made for a coder. It operates at a frequency of approximately 3300 mc. Photographs and diagrams are included.

PB 19248. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for model AN/APS-4A aircraft radar equipment. (CO-AN 16-30APS4-3-M) Jul 1945. 360 p. Price: Microfilm-$4.00 - Photostat-$24.00
This handbook describes the Model AN/APS-4A aircraft radar equipment and includes information concerning its installation, adjustment, operation and maintenance. This equipment is a search type radar operating at 9,375 ± 55 megacycles, designed primarily for the detection of surface vessels and aircraft. The equipment operates over six ranges: 2, 7, 30, 50, 100, and 180 nautical miles. The 100-mile range is available only for radar and the 180-mile range only for beacon service. The antenna scans through 150 degrees in azimuth (75 degrees to the right and 75 degrees to the left of dead ahead) and the reference tilt can be adjusted vertically to any position between 10 degrees above and 30 degrees below the longitudinal axis of the aircraft. Two types of scanning are provided: a two-line scan and a four-line scan. The equipment supplies both radar and beacon services. Photographs, schematic diagrams, tables, and wiring diagrams illustrate the text. There is a parts list. The main differences between this equipment and the AN/APS-4 equipment(which is described in PB 19251) are enumerated in this handbook.

PB 14297. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for transmitting equipment AN/APQ-2A or AN/APQ-2B. (AN 16-30APQ2-3) Apr 1945, rev Aug 1945. 65 p. Price: Microfilm-$1.00 - Photostat-$5.00
This is an airborne barrage jamming equipment designed to confuse or obliterate the information presented by enemy radar operating in the frequency range of 200 to 550 megacycles. Power output varies from 20 watts at the lowest frequency to 5 watts at the highest. The equipment produces an ultra-high frequency carrier which is amplitude modulated by hash or a noise signal. The modulator signal has components extending from 100 kilocycles to 3.5 megacycles. Handbook contains instructions for installation, operation, and maintenance, table of replaceable parts, schematic diagrams, and photographs.

PB 22761. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of operating instructions for model AN/APS-2F radar equipment. (AN 08-30APS2-2) Feb 1944. 95 p. Price: Microfilm-$1.00 - Photostat-$7.00
This instruction manual supplies information for the installation, operation, and emergency repair of the AN/APS-2F radar equipment, designed for use with heavier-than-air aircraft. Illustrations include drawings and schematic diagrams. This equipment has been designed for normal search and beacon operation.

PB 19246. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of operating instructions for Model AN/APS-4 aircraft radar equipment. (AN 08-10-202) Jan 1945. 84 p. Price: Microfilm-$1.00 - Photostat-$6.00
This handbook gives a full description and complete operating instructions for the AN/APS-4 aircraft radar equipment. The AN/APS-4 aircraft radar equipment is a light-weight airborne equipment for operation at frequencies in the X-band. It can be employed for: (1) Radar search operation over large bodies of water for the detection of vessels on the surface; (2) Mapping and navigational operation; (3) Detection and location of other aircraft to permit their interception; (4) Picking up the code signals from beacon stations in the X-band to facilitate the return of the searching plane; and (5) Operation as the search element in conjunction with identification and LAB equipment. This equipment searches by means of an oscillating and nodding antennas which projects a beam of pulses of r-f energy into space and receives reflected pulses back from targets in the path of the beam. Drawings and assembly diagrams illustrate the text.

PB 20814. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of operating instructions for model AN/APS-15 aircraft radar equipment. (AN-08-30APS15-2). Feb 1944. 73 p. Price: Microfilm-$1.00 - Photostat-$5.00
The purpose of this manual is to supply information for the installation, operation and emergency repair of this aircraft radar equipment. Drawings and diagrams are included.

PB 20812. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Philco field engineers training manual for model AN/APS-15. (CO-AN-08-58-130). Apr 1944. 218 p. Price: Microfilm-$2.50 - Photostat-$15.00

The report outlines a course of training for radar operators and maintenance men on the air-borne search radar, AN-APS-15. A lecture outline and schedule is followed by lectures and illustrations, together with shop projects and examination questions. Both lectures and projects are made as practical and concrete as possible. Photographs, drawings and diagrams are included.

PB 17463. WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY. RADIO DIVISION. Instruction book for Model TCE-1 radio transmitting equipment. (Instruction Book 7226) Jun 1940. 223 p. Price: Microfilm-$2.50 - Photostat-$15.00
This manual describes and gives instruction for installing, operating and maintaining the Navy TCE-1 radio transmitting equipment. This equipment is intended for use on certain types of small surface craft. When used in conjunction with suitable receiving apparatus this equipment will provide communication by telegraph or telephone over a frequency range of 350 to 9050 kc. The equipment is designed for operation with a power supply delivering 120 volts 600/800 cycles a.c., 800 watts and 12 to 15 volts d.c., 2 amperes. The types of transmission are CW, MCW, and telephony. The manual contains a list of units required for the equipment, a spare parts lists, photographs, and schematic drawings.

Generators, Motors, Transmission, Distribution and Allied Equipment

German

PB 19268. KUSTERS, N. L. and LLOYD, C. G. Some phases of German electrical utility practice. (BIOS Final Rept 129, Item 33). n.d. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
Brief observations are given on switching substation practice, generation and distribution system in Berlin, and AC and DC high voltage (400 kv) transmission. The latter was in the experimental stage. Schematics of substation and Berlin systems are appended.

PB 18583. MATTHIAS, LYNN H. Survey of German low voltage motor control equipment. (FIAT Final Rept 669) Jan 1946. 44 p. Price: Microfilm-50¢ - Photostat-$3.00
The purpose of this review is to indicate the trend of thought in Germany and to present those new developments and ideas worth considering by American designers. Electrical switching devices as classified by "Verband Deutscher Electrotechniker" standards, are given. Magnetic contactors and motor starters of new German design are discussed. Also discussed are manual switches and motor starters. Characteristics of overload relays and releases, control circuit devices, and miscellaneous related subjects make up the remainder of the report. The 26 companies visited and the personnel interrogated are listed. Photographs, charts, graphs, and tables are included.

PB 14588. BÜLL, W. von der. Lader. (Supercharger). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik III B 1). (ALSOS Mission, Klotter File 11 C) Jul 20, 1937. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This pamphlet is one of a series published by the German Air Ministry. The efficiency of the supercharger and the relation of performance to altitude is studied. The measurement and the measuring instruments are described. Definitions and the codes used in the calculations are listed. Formulas, graphs, drawings, photographs, and bibliography are included.

PB 9298. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zur vermeidung der kontaktabnutzung von pendelwechselrichtern. (Arrangement to reduce wear of vibrator contacts). German patent application T59641 VIIId/42, Oct 10, 1943 still pending. Original inventors: Leifer and Schilgen. 1943. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9292. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Elektrische steuereinrichtung, insbesondere für selbsttätige kurshalteeinrichtungen. (Electrical steering device for automatic steering systems). German patent application T59615 XI 62b October 2, 1943 and still pending. Original inventor: Dr. Nestel. 1943. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 10849. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Steckerbüchse. (Plug receptacle). German patent application T 59020 VIII v/21c, applied Apr 22, 1943, still pending. Original inventor: Paschke. 1943. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9286. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Zerhacker mit dicht abgeschlossenem Gehäuse. (A vibrator in an air tight case). German patent application T57327 VIIIa/21g May 1, 1942 still pending. Original inventor: Leifer, 1942. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 23391 and PB 23392. U. S. STRATEGIC BOMBING SURVEY. Vol. 1., Electric utility plants in central Germany, western Germany. Vol. 2., Electric utility plants in western Germany, southern Germany, Austria and northern Italy. (Rept 206 - Utilities Div Plant Repts 1-10; Rept 207 - Utilities Div Plant Repts 11-20). Oct 1945. PB 23391 (Vol. 1), 158 p. Price: Microfilm-$2.00 - Photostat-$11.00. PB 23392 (Vol. 2), 192 p. Price: Microfilm-$2.00 - Photostat-$13.00
These two volumes, containing twenty reports on electric utility plants located in central Germany, western Germany, southern Germany and Austria, and Italy, based on plant surveys made Apr 12 - Jul 5, 1945. The study of Germany electric generating plants was undertaken by the Utilities Division with the following objectives in view: To determine the effect of physical damage due to strategic bombing, and its consequences to production; to measure vulnerability and recuperability of these plants; to secure data on actual bombing attacks, correlating it with intelligence information; and to obtain such other facts and material as are pertinent to this survey. German generating plants are generally in two varieties, thermal (steam) and hydro, and each of these can be subdivided into various types. In order to study a comprehensive cross section of all types of plants, one or more of each type was selected. A total of 23 plants were studied of which 15 were thermal plants and 8 were hydro plants. Of the 23 plants, 14 had been bombed. In arranging the reports geographically PB 23391 contains central Germany reports 1 to 5 and western Germany reports 6-10. PB 23392 contains western Germany reports 11 to 15, southern Germany and Austria reports 16 to 19, and northern Italy report No. 20. The five plants surveyed in central Germany were located in Bohlen, Espenhain Molbis, Golpa Zschornewitz, Thalheim and Bitterfeld. The ten plants surveyed in western Germany were located in Frenmerdorf, Vereinigte Ville Berrenrath, Fortuna, Zufunft, Essen Central, Karnap, Reisholz, Koepchenwerk, Hattingen, and Mannheim. The four plants visited in southern Germany and Austria were located in Häusern-Witznau, Albruck, Walchensee, and Obervermunt-Vermunt-Rodund. Report 20 covers northern Italy plants and substations. Each report covers summary, the plant and its function in enemy economy, attacks (if any), effect of bombing (if any), intelligence check, evaluations and impressions; also exhibits containing plot of plant, layout drawings, aerial view, and photographs.

Japanese

PB 22638. GRENELL, L. H. and others. Examination of enemy material (OD-113) (AC-77): Metallurgical examination of a Japanese "Zeke" aircraft volt box. Progress report 118, Aug 31, 1944. (OSRD Rept 4215; War Metallurgy Committee Rept M-386) Oct 1944. 9 p. Price: Microfilm-50¢ - Photostat-$1.00

In the examination of the Japanese volt box, special emphasis was placed on the examination of materials used for springs and contact points. The tension springs used in the cutout and regulators were made from a 4 percent tin phosphor bronze. The contact points were of two types, a copper silver alloy and a platinum iridium alloy. No unusual use of material was noted with the exception of the cloth-covered, square copper wire which was used in winding the cutout and current limit relays, in place of round enameled wire which is used as standard material in this country. The volt box housing was die cast from an aluminum alloy containing copper and silicon in a ratio not commonly used in this country. The protective coatings were of excellent quality. Photographs and tables appear in the appendix.

United States

PB 18989. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Reference book for ships' service electric power plants and electric propulsion systems. (NavShips 250-660-10, 250-660-11, 250-660-12, 250-660-13, 250-660-14). Sep-Oct 1945. 176 p. Price: Microfilm-$2.00 - Photostat-$12.00
The purpose of this work is to set forth some of the engineering considerations which determine the specific requirements contained in the General Specifications for Machinery and in the Navy Department or Bureau of Ships Ad Interim Specifications relative to the design of ship's service electric plants, power distribution systems and associated equipment as well as electric propulsion systems. Technical data and procedures useful in checking the design and performance of ship's service electric plants and equipment are also provided. Five chapters are included in this report and five more are in preparation. The chapter titles are: (1) Ship's service electric plant and power distribution system; (2) Voltage regulation of A-C ship's service electric power system; (3) Frequency regulation of A-C ship's service electric power system; (4) Fault protection of ship's service electric power distribution systems; and (5) Current capacity of electric cables in Naval service. Diagrams and graphs are included.

PB 22216. U. S. WAR DEPARTMENT. Converter M-222. (Tech Manual 11-344) Jan 1943. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
Converter M-222 is designed to supply emergency ringing current for telephone switchboards. Two Signal Corps batteries BA-23, in series, are used as a source of power. This manual describes functioning and maintenance of the converter. There are photographs and diagrams.

PB 22012. U. S. WAR DEPARTMENT. Power unit PE-167-A. (Tech Manual 11-946) Oct 21, 1944. 46 p. Price: Microfilm-50¢ - Photostat-$4.00
This is a complete, self-contained gasoline-engine-driven electrical generating set for charging 12-volt storage batteries. The unit consists of a 4-cycle gasoline engine, a 15-volt, 350-watt, d-c generator, and a control box. The engine is a single-cylinder, 4-cycle 1-head air cooled unit with a 3-inch bore and a 3-inch stroke. The generator is a self-excited shunt field type with a separate starter winding. The control box is mounted on the generator. Instructions are given for the installation, operation, maintenance and repair of the unit and its components. Photographs, charts, diagrams, tables and parts lists are included.

PB 22013. U. S. WAR DEPARTMENT. Power unit PE-185-B. (Tech Manual 11-925-B). Aug 5, 1944. 314 p. Price: Microfilm-$3.50 - Photostat-$21.00
This unit is intended to supply power for the operation of electrical equipment. It consists of a Diesel engine and a generator to which the Diesel engine is directly connected. The Diesel engine is a 4-stroke cycle, full Diesel, solid injection type. The a-c generator is a 3-phase, 4-wire, 60-cycle alternator, rated at 25 kw., 31.3kva., 87 amperes, at 80% power factor, 1200 r.p.m., 208/120 volts at full load. The exciter is rated at 1 kw., 125 volts and 8 amperes. Following the principles of operation of the component systems of the unit, are instructions for the installation, operation, maintenance, overhaul and repair of the unit and its components. Descriptive data tables, photographs, diagrams, charts and parts lists are included.

PB 22192. U. S. WAR DEPARTMENT. Rectifier power unit PP-77/PSM-1. (Tech Manual 11-979). Mar 1945. 39 p. Price: Microfilm-50¢ - Photostat-$3.00
Rectifier power unit PP-77/PSM-1 is a component of depot crystal equipment. The unit provides filament and plate voltages for crystal test sets and frequency meters originally operated from batteries. The power supply consists of a constant voltage transformer, a filtered full-wave rectifier circuit for the d-c plate voltages, a filtered selenium rectifier circuit for the d-c filament voltages, voltage dividers, output circuits, and a calibrating circuit for setting up the required output voltages. Photographs and diagrams accompany this instruction manual.

PB 22191. U. S. WAR DEPARTMENT. Rectifier RA-63-B. (Tech Manual 11-962). Sep 1944. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
This is a full-wave, selenium disk rectifier capable of converting 105- to 125-volt, 1-phase, 60-cycle, a-c power into direct current for charging lead-acid storage batteries. When used with radio sets SCR-399-( ) and SCR-499-( ), it provides charging current for the auxiliary battery. The rectifier consists of a subassembly including one power transformer and its terminal block, one selenium rectifier stack, one cut-out relay, and one terminal strip, all mounted in a steel casing. This instruction manual is illustrated with photographs and diagrams.

Miscellaneous

German

PB 17363. KABELWERK DUISBURG. Isolierte electrische leitung. (Insulated electrical cable). (MIS VII 68a 12 7002769). May 8 to Nov 15, 1940. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Correspondence between the author and the Allgemeine Elektrizitäts-Gesellschaft in Berlin about a concession on the latter's registered design #1481831 on subject material.

PB 14944. LANGE, HEINRICH. Bericht über die arbeiten: Elektromagnete für laboratoriumszwecke. (Report about studies on electromagnets for laboratory purposes). (Kaiser Wilhelm Institut für Eisenforschung). (ALSOS Mission, Hoyt File 93). May 1945. Price: Microfilm-50¢ - Photostat-$1.00
This report describes the construction of an electromagnet of medium field strength, using a low excitation current and providing a large area for experimentation.

PB 22928. LIGHTON, L. E. Aircraft batteries (lead and alkaline) - The Accumulatoren Fabrik AG., Hagen - Hannover plants. (Naval Tech Mission in Europe Tech Rept 212-45) Aug 1945. 65 p. Price: Microfilm-$1.00 - Photostat-$8.00
The AFA group is the principal storage battery manufacturer in continental Europe. The company is one of the oldest storage battery manufacturers in the world, and has long been the center of European battery research. As the company had extended its manufacturing facilities to include storage batteries made of all known practical combinations, i.e., lead acid, nickel-iron and nickel-cadmium, and as it was also a large manufacturer of primary batteries of the dry cell (carbon-zinc) type, it was considered as principal supplier by the German Government. The government had set up a storage battery supply section under the direction of Karl Pfalzgraf, a smaller storage battery manufacturer of Berlin, under whose direction orders for different kinds of

batteries were placed where they could be most readily and efficiently produced. All German battery plant expansion and production control was under Pfalzgraf's direction, and most special storage battery production seemed to be directed to AFA. It is judged therefore that practices of this company should be quite representative of all German secondary battery industry, and this company's facilities were therefore chosen for thorough investigation. This report covers in detail the manufacturing of lead aircraft batteries and a special development of sintered plate construction for alkaline aircraft batteries of the nickel cadmium type at the AFA Hannover Plant. This copy of the original report lists the materials shipped for examination, consisting of drawings, catalog and storage battery parts for torpedo, submarine and Duracell cells. Photographs of the exterior and interior of the plant are shown, together with graphs of test results, but no drawings are included.

PB 17378. SCHMID, E. H. Anschlüsse bei aluminiumleitern (Connections of aluminum conductors.) Versuchabericht S-27 (MIS VII 70d 7002834). Mar 1941. 43 p. Price: Microfilm-50¢ - Photostat-$3.00
This report was made by the French "Societé general de constructions electriques et mecanique" at Belfort, France, and translated into German by or for the Allgemeine Elektricitäts Gesellschaft. In German.

PB 9235. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verfahren zum hartlöten mittels punktschweissung. (Method of brazing with a spot-welder.) German patent application T61299 VIIIc/21h, Dec. 30, 1944 still pending. Original inventor: Gronau. 1944. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
This invention pertains to the use of a thin strip of brass as an intermediate for brazing steel sheets by the use of spot welding equipment. By applying less heat than is required for welding the steel will be brazed along the whole length of the seam resulting in an airtight union which is practically unobtainable by the usual spotwelding methods.

Japanese

PB 22318. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of Japanese electrical cable. Progress report 156, Jan 24, 1945. (OSRD Rept 4777) Mar 1945. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
This report covers the examination of twelve pieces of Japanese electric cable to determine the composition, design, and fabrication details. The cables examined were found to be of fairly good quality and design. The conductors were pure copper in the annealed condition and, in many cases, were tin coated. Two cables designed for high-frequency work, and another for conditions where water-proof qualities were required. Lead sheaths were examined and found to be of pure lead; in some cases 1/2% antimony was added for hardening purposes. Rubber, in all cases, was natural rubber; extrusions and rubber wrappings were about equally common tables and a photograph are included. This report is based on data gathered at Battelle Memorial Institute and information received from Rome Cable Company, Rome, New York.

United States

PB 19227. RADY, ISIDORE. Calibration of electrical test equipment in the performance test section. (Squier Signal Lab Eng Rept 18) Dec 1945. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes the methods used in the Performance Test Section of the Squier Signal Laboratory at Fort Monmouth to calibrate non-electronic electrical test equipment. Primary and secondary standards used are listed and brief description of calibration methods for voltmeters, ammeters, wattmeters, resistors, wheatstone bridges, Kelvin bridges, and similar equipment are given. Circuit diagrams of some types of test equipment are included.

PB 21126. BICHOWSKY, F. R. Studies and investigation in connection with the possibility of increasing the capacity of lead storage batteries by modification of the negative plate: Final report, Jun 1 to Oct 1, 1942. (OSRD Rept 1926) Oct 1943. 76 p. Price: Microfilm-$1.00 - Photostat-$6.00
This report deals with submarine storage batteries. It is concluded that by suitable modification of plate thickness spacing, and acid density, it may be possible to increase the capacity of submarine batteries of a given size by as much as 34%. The conclusions are tentative and the experiments should be checked with another laboratory. Appendices contain exact calculation of storage battery sizes and weights, bibliography, and patent search. The report was done under contract with Catholic University.

PB 15856. FIELD, A. L. and others. Development of armor welding electrodes (OD-36-2): Relation of the composition of Austenitic (20 Cr-10 Ni) electrodes to the physical and ballistic properties of armor weldments. Progress report, Jun 15, 1943. (OSRD Rept 1636) Jul 1943. 37 p. Price: Microfilm-50¢ - Photostat-$3.00
This report covers investigations on restrained double bevel armor joints welded with electrodes having variations in manganese content combined with variations in molybdenum content. Testing included determination of sensitivity to center root bead cracking, interface cracking, as well as X-ray, macro etch, and metallographic examination. Physical and ballistic properties were determined by tensile tests and a special explosion test. This work was carried on by the Rustless Iron and Steel Corporation. Significant features disclosed were: 1. Variations in manganese and molybdenum content affected sensitivity to root cracking, possibly affected susceptibility to interface cracking, and appeared related to tendency to transformation to martensitic structures on heavy dilution; ballistic properties could not be related to composition; no indication could be found that molybdenum added through the electrode coating produced any different properties than when added through the core wire; induction melted experimental heats gave comparable results to a commercial electric-arc furnace heat. Tables of results, drawings, photographs and photomicrographs accompany the report. The second part of this investigation is reported in PB 15842.

PB 22580. PARDUE, T. E. and others. Electrical resistance changes in fine wires subjected to plastic and elastic elongation. (Naval Research Lab Rept O-2377) Sep 1944. 31 p. Price: Microfilm-50¢ - Photostat-$3.00
The construction and use of resistance wire strain gages requires a knowledge of some properties of suitable wire materials used in their construction. Curves showing changes of resistance versus strain and simultaneous values of stress versus strain are presented for small diameter wires of nickel, iron, steel, and for some alloys of nickel with chromium, copper, and aluminum. A bibliography is included.

PB 16346. SACK, H. S. Constancy of EMF'S of dry batteries. (NDRC Rept 14:537) Oct 1945. 9 p. Price: Microfilm-50¢ -Photostat-$1.00
Measurements, reported in tables in this report, indicate that the EMF of dry batteries remains constant over long periods of time to better than .05%, provided no current is taken from the batteries. Measurements were taken over periods of from two to three months.

PB 22682. U. S. ENGINEER BOARD. "Weld" stroboscopic searchlight. (Rept 645) n. d. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This report covers tests made on a working model of the subject item to determine whether it is usable to cover a wide field of view along a horizontal line, as in beach

defense. The equipment consists of a reflector which may be rotated about the lamp which is in a fixed position. Following tests at Fort Belvoir, it was concluded that because of the greatly decreased illumination upon a target, resulting in a corresponding reduction in visibility, the lamp wattage would have to be increased to impractical value to attain the visibility obtained with a stationary light source, and that the mechanism involved in equipment of this type is inherently complicated and cumbersome for large sized searchlights, making them less portable and simple in operation than the types now in use. Photographs are included.

PB 18970. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Degaussing manual; Sections I-IX, revised (and Section X, dated Jan 1945). (NAVSHIPS 660). Oct 1944. 237 p. Price: Microfilm-$2.50 - Photostat-$16.00
This manual summarizes Bureau of Ships degaussing information for the use of the field activities. Degaussing is the counteracting of the magnetic field of the ship and may be accomplished either by installing coils in a ship to counteract the field of the ship, or by magnetizing the ship's steel so that the permanent magnetization will, as much as possible, be equal and opposite to the induced magnetic field. The following sections are included in the manual: (1) Introduction; (2) General information on degaussing; (3) Design of degaussing coils; (4) Installation of degaussing equipment on merchant vessels; (5) Installation of degaussing equipment on Naval vessels; (6) Polarity designation and marking of degaussing installations; (7) Material for degaussing; (8) Testing and reporting of degaussing installations; (9) Inspection and maintenance of operating degaussing installations; (10) Compass compensation for degaussing. Installation plans, wiring diagrams, and charts are included.

PB 18969. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Electrical power and lighting equipment and installations, a compilation of papers prepared by personnel of the Electrical Section. Jul 1944. 536 p. Price: Microfilm-$5.50 - Photostat-$37.00
This collection of 54 informal papers was prepared for discussions of the background engineering involved in developing and applying electrical power and lighting equipment in Naval vessels. A variety of topics is covered, including: HI shock; cable ratings; insulation resistance of heat and flame resistance cable; design of electric motors; darkened ship lighting; reconditioning of submerged electrical equipment; voltage regulation of a-c power systems; design and application of protective devices; degaussing; and others. Photographs, curves, and diagrams are included. See also PBs 18958 and 18965.

PB 18965. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Electrical power and lighting equipment and installations, a compilation of papers prepared by personnel of the Electrical Section. (NAVSHIPS 250-605). Nov 1944. 614 p. Price: Microfilm-$6.50 - Photostat-$41.00
The 52 papers reproduced in this report were prepared as background material for discussions of engineering problems involved in developing and applying electrical power and lighting equipment in Naval vessels. Among the varied topics discussed are: HI shock; cable end sealing; cable rating; insulation resistance of Navy heat and flame resistance cable; casualty power system; design of electric motors; developments and problems of darkened ship lighting; electrical installation problem; reconditioning submerged equipment; design and maintenance of generators; voltage regulation of ship's service power systems; fault protection on ship's service power systems; transformers; and others. Photographs, drawings, diagrams, graphs, and tables are included. See also PBs 18958 and 18969.

PB 18967. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instructions for repair and maintenance of married type magnetic minesweeping cable. (NAVSHIPS 250-00-3). Sep 1944. 154 p. Price: Microfilm-$2.00 - Photostat-$11.00
This manual gives information on various types of married magnetic mines weeping cables and includes detailed instructions of procedures for handling of cables aboard ship, handling cables and reels at base, installation of cables aboard ship, repair of cables aboard ship, repair of cables at base, operating hydraulic press, and operating transformer vulcanizer. Included are a number of photographs, sketches, drawings, assembly drawings and a temperature curve for the electric vulcanizer which clarify the operations to be performed.

PB 18966. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Maintenance and repair of concentric type magnetic minesweeping cable. (NAVSHIPS 250-603). Sep 1944. 158 p. Price: Microfilm-$2.00 - Photostat-$11.00
The purpose of this manual is to provide complete cable and cable accessories information as applied to the concentric-type magnetic-minesweeping cables. The manual is intended as a guide for the handling, repair, maintenance, and installation of concentric type magnetic minesweeping cables. Included are detailed instructions of procedure for: handling cables at base, handling cables aboard ship, repair and maintenance of cables aboard ship, repair cables at base, installation instructions, instructions for operating the hydraulic press, and instructions for operating the transformer vulcanizer. The manual contains a number of photographs, drawings, a wiring diagram and a temperature curve for the electric vulcanizer which clarifies the operations to be performed.

PB 18958. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Shipboard electrical power and lighting equipment, papers for inspectors' conference prepared by personnel of the Electrical Section. (NAVSHIPS 250-660-1). Mar 1945. 252 p. Price: Microfilm-$3.00 - Photostat-$17.00
The 28 papers reproduced in this report have been prepared as a basis for conference discussions of the background engineering involved in the development, design and manufacture of electrical power and lighting equipment for Naval vessels. The topics covered include: Developments based on wartime operating experience; shock and vibration testing; circuit breakers and fault protection; switchboards for Naval vessels; shipboard cable; electric motors; searchlights; propulsion electrical equipment; and various procurement and packaging subjects. Photographs, curves, and diagrams are included. See also PBs 18965 and 18969.

PB 18962. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Shock mounts for Naval shipboard service. (NAVSHIPS 250-600). Jun 1944. 83 p. Price: Microfilm-$1.00 - Photostat-$6.00
It is necessary, in the design of shock mounts for Naval electrical equipment in shipboard service, to consider factors not usually encountered in the design of resilient mounts. Shock mounts must be designed to protect equipment from the severe shocks which occur during service. It is not usually possible to use such mounts to isolate shipboard vibration; rather, a mount is considered satisfactory if amplification of the vibration is held within reasonable limits. Six requisites of a satisfactory shock mount are listed. The proper location for the mounts should be determined and the type of mount selected. Methods for finding the mount rating necessary to meet the frequency requirements are given in detail in the report. The methods embody determining the physical characteristics of the equipment; finding the mount stiffness necessary to attain the minimum natural frequency in all rocking modes; and selecting a mount having the required stiffness. A partial list of mounts and the pertinent stiffness data for these mounts are given as Appendix A.

PB 18960. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Symposium on the effect of shock on electrical equipment. Vol. II. Oct 1943. 172 p. Price: Microfilm-$2.00 - Photostat-$12.00
The objective of this symposium, held by the Electrical Equipment Shock Committee, was a review of the state of advancement of the research, development and design work in this field since 1940. This volume contains the following papers: "Description of shock", by E. G. Fischer; "Measuring instru-

sents for shock", by Irwin Vigness; "Light-weight class H.I. shock machine characteristics", by R. G. Lorraine; "Medium-weight H. I. shock machine characteristics", by T. P. Kirkpatrick; "Mounting apparatus for test on shock machine", by R. I. Wells; "Shock mounts", by J. N. Macduff; and "Designing for shock protection", by W. P. Welch. The papers are illustrated with tables, photographs, diagrams, and graphs.

PB 22367. U. S. WAR DEPARTMENT. Balloon assembly MX-591 ( )/GR. (Tech Manual 11-2699) Aug 1945. 35 p. Price: Microfilm-50¢ - Photostat-$3.00
This is a non-rigid low pressure type balloon for use as an antenna support. Detachable stabilizers give the balloon the vertical and horizontal stability necessary to provide a relatively stationary antenna support regardless of the buffeting of the winds. A description of the unit and its components is followed by instructions for the installation, operation, maintenance and repair of the balloon. Photographs, tables, charts and a list of references to other applicable Army publications are included.

PB 22205. U. S. WAR DEPARTMENT. Battery charger PP-78/MSQ-2. (Tech Manual 11-2527). Jun 1944. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
This manual contains a description and instructions for a battery charger consisting of the necessary transformer-rectifier combination to convert alternating current to direct current. It can charge a 6- or 12-volt lead acid-type storage battery at a maximum rate of 20 amperes. There are photographs and a schematic diagram.

PB 22187. U. S. WAR DEPARTMENT. Ceiling light set AN/TMQ-2. (Tech Manual 11-2416) Jan 1945. 53 p. Price: Microfilm-$1.00 - Photostat-$4.00
This ceiling light set is a transportable equipment which is used at night to determine cloud heights up to 10,000 feet. The set consists mainly of ceiling light projector ML-318/TMQ-2, generator G-5/TMQ-2, a voltage stabilizer, and clinometer ML-119-( ). The beam has a spread of about 1° and a maximum intensity of approximately 2,500,000 candles. This manual contains operating and maintenance instructions. There are photographs and diagrams.

PB 21942. U. S. WAR DEPARTMENT. SIGNAL CORPS. Ceiling light projectors ML-121-A, ML-121-B, ML-121-C, ML-121-D, ML-121-E, ML-121-F, and ML-121-G. (Tech Manual 11-421). Oct 1944. 29 p. Price: Microfilm-50¢ - Photostat-$2.00
These projectors are used with other instruments, to determine the heights of the clouds, by projecting a vertical beam of light from the ground to the zenith. Ceiling heights to 10,000 feet may be measured in this manner. The projector consists of a projector drum on a supporting base, an optical system, and a transformer. Instructions are given for the installation, operation, and maintenance of the equipment and its components. Photographs, tables, charts, and a parts list are included.

FOOD AND KINDRED PRODUCTS

PB 18871. PRESCOTT, SAMUEL C. Troop feeding programs, a survey of rationing and subsistence in the United States Army 1775 to 1940: Final report. (OSRD Rept 3598) Mar 1944. 339 p. Price: Microfilm-$3.50 - Photostat-$23.00
This report represents a comprehensive investigation of troop feeding in the U. S. Army from the period of the Revolutionary War up to the beginning of World War II. The project was undertaken by the Massachusetts Institute of Technology at the request of the Research and Development Branch of the Office of the Quartermaster General to provide historical perspective for the evaluation of current subsistence problems. Sections of this book are headed, as follows: I. Establishment of the ration for troops and legislation pertaining thereto, 1775-1789; II. Legislative changes affecting the ration, 1789-1818; III. Subsistence and rationing under the commissariat, 1818-1861, with supplement, Army regulations and revised statutes: IV. The ration in the period of 1861-1912, including the Civil and Spanish Wars, with supplement, Army regulations and special statutes, and appendix, Quotations on use of ration by the soldier; V. Subsistence and rationing programs under the Quartermaster Corps, with appendix, The work of the Food Division, Sanitary Corps. Tables and selected bibliography, chronologically arranged, are included.

PB 23753. SPAGHT, M. E. The manufacture of synthetic butter. (CIOS File XXXI-79, Item 22) Oct 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
During the war years, a synthetic butter was being manufactured by the Deutsche Fettsäure Werke in Witten (Ruhr), Germany. The output of finished product was 11,000 pounds per day. The process involved the manufacture of straight chain aliphatic acids of C_{11} and C_{12}, and their esterification with glycerine. The resulting ester mixture was refined and purified. It was sold largely to hospitals where it was favored for certain diets, and the remainder was purchased by the German Army. The product was competitive with margarine in price and could have been sold with profit at 60 percent of the price of natural butter.

FUELS AND LUBRICANTS

PB 23755. BUOH, JOHN W. Mining method for a five foot seam pitch 25° to 50° at Mine Fritz, Hoesch A. G., Essen-Ruhr. (CIOS File XXX-29, Item 30) 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
During a visit to a moderately pitching coal seam in the Ruhr district, it was learned that mining seams of from 25 to 50 degrees pitch is more difficult than mining seams on steeper pitches where backfilling is used because filling material is difficult to "run" and in addition must be confined to the mined-out area by wire mesh or other means. The stepped-face method has proved the most satisfactory. No mechanical method has been devised which has proved satisfactory. The mining method is described.

PB 23020. CHAFFEE, C. C. and OZOL, R. J. Compilation of German fuels and lubricants specifications. (CIOS File XXXI-58, Item 30) Aug 1945. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
Information was obtained on German armed forces fuels and lubricants specifications from documents collected during CIOS field trips. The specifications were translated and are briefly reviewed in this report. Information on the reason behind specification changes may be obtained by a detailed study of individual plant operations reported by CIOS investigators. It is intended that this report only summarize technical data on specifications. This data is presented in four categories; motor fuels, aviation fuels, lubricants and greases. The translated specifications and comments on test technique are appended. In general the quality of fuels and lubricants as set by specifications was fairly well maintained during the war.

PB 17384. GERMANY. REICHSLUFTFAHRTMINISTERIUM. Technische lieferbedingungen für das korrosionsschutzmittel "Schutz81 39". (Technical specifications for the anti-corrosive "protective oil 39"). (MIS 70 e 7001543) May 1939. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
General information is given respecting production, containers and raw material (mineral oil); specifications are listed covering degree of purity, capability of emulsification, resistance to cold, total fat content, ash content, miscibility, stability in storage, and quality control. In German.

PB 23027. LOWRY, H. H. and ROSE, H. J. Coal and coke research at Firma Carl Still, Recklinghausen I. W. (CIOS Evaluation Rept 371) Sep 1945. 1 p. Price: Microfilm-50¢ - Photostat-$1.00

The interview reported briefly here tended to confirm the statement made that this organization did not do scientific work on coal and coke but used only standard tests. They had no interest in low-temperature carbonization, except for construction of byproduct recovery plants. It was admitted that the Still system of withdrawal of byproducts from high-temperature ovens was not used except at the plant of Rochling Werke near Saarbrücken. They reported no difficulties either in heat distribution or door-sealing (self-sealing doors manufactured by Wolf in Linden near Dahlhausen) in use of 6-meter high ovens which they have built at Zeche Nordstern (Gelsenkirchener Bergwerks A. G.).

PB 23194. LOWRY, H. H. and ROSE, H. J. Coal and coke research at H. Koppers G.m.b.H., Essen. (OIOS File XXXI-31, Item 30) Jul 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
The plant of Dr. H. H. Koppers was reported as 60% destroyed and the laboratories were largely inactive at the time of this visit. A method of gasification of pulverized coal with steam and oxygen was said to offer promise, but all records and data were said to have been removed previously by an officer of the United States Navy.

PB 22713. SCHADE, R. A. The preparation of tetrahydrofuran polymers as a synthetic lubricant for metals. (Naval Tech Mission in Europe Tech Letter Rept 123-45 (S)) Jun 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
The information given was obtained from Dr. Delfts of I. G. Farbenindustrie during an interview at the Leverkusen Plant on May 26, 1945. It has been found that by a complicated procedure, tetrahydrofuran will polymerize, in the presence of a catalyst, to compounds having properties desirable in a lubricant. The nature of the polymeric complex can be changed by the addition of co-polymerizing substances such as ethylene oxide and its derivatives. The nature of the polymer ranges from liquid to a relatively tough solid melting at about 60 degrees Centigrade. The physical state for a particular use depends upon the catalyst used, the temperature of operation and the molecular ratio of tetrahydrofuran to other copolymerizing components. From a long research it has been shown that the best catalyst is a complex of ferric chloride and thionyl chloride. Special materials of construction are needed because of the corrosive nature of the reaction medium. A simple polymer of tetrahydrofuran has been made which is identical with polybutylene glycol. This glycol and its esters have also been used as lubricants. Compounds have been made for crankcase lubrication of internal combustion engines and for high temperature steam lubrication applications by the co-reaction of tetrahydrofuran with 50 and 25 parts by weight of ethylene oxide respectively. The involved process of manufacture, the limited availability of the necessary raw materials and the cost would preclude any large scale production of these lubricants in competition with refined natural hydrocarbons. No operating or performance data are available for these synthetic oils. The basis for their lubricating value to date is dependent on their physical properties. A synthesis is also described for the production of the tetrahydrofuran monomer from formaldehyde and acetylene by liquid phase condensation.

INSTRUMENTS (PROFESSIONAL, SCIENTIFIC AND CONTROLLING)

PB 22369 JACKSON, L. R. and others. Examination of enemy materiel (OD-113; AC-77): Metallurgical examination of a German and a Japanese aircraft rate of climb indicator. Progress report 126, Sep 15, 1944. (OSRD Rept 4281) Oct 1944. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
This report, from the Battelle Memorial Institute, covers the comparison of a German and a Japanese rate of climb indicator for material and fabrication. The 2 instruments differ widely in a number of important aspects. The Japanese resembles the conventional American model, and the German is much lighter and simpler, being very well made with fully jewelled movement. All of the information obtained from chemical, spectrographic, microscopic, macroscopic, and physical examination of the components of each model is given in tables in the appendix together with photographs of the instruments and of the disassemblies, with numbered parts corresponding to those used in the tables.

German

PB 18226. AUWÄRTER, MAX. Untersuchungen von optischen eigenschaften des quarzglases zwischen 0, 2/u und 3, 0/u (Experiments on optical qualities of the quartz-glass between 0,2/u and 3, 0/u.). (ALSOS Mission, Gerlach IV A 14) Aug 1944. 41 p. Price: Microfilm-50¢ - Photostat-$3.00
This illustrated and detailed study is marked "secret"; it was sent to Prof. Gerlach, Munich, as the head of the Institute for Electrophysics. The object of this research work was to find a method to replace glass by quartz for optical precision instruments of highest quality. The author admits that he could not yet attain his object. The report is illustrated with microphotographs and graphs. A list of references is included.

PB 18753. GERMANY. REICHSFORSCHUNGSRAT. Angebote und bestellungen (Offers and commercial orders). (ALSOS Mission, Gerlach 23) n.d. 243 p. Price: Microfilm - $2.50 - Photostat - $17.00
This file contains the commercial orders for instruments, etc. to be used in the physical research institute (director, Prof. Gerlach) of the Reichsforschungsrat. It shows the scarcity of material in Germany, especially in the last months of 1944 and in the beginning of 1945.

PB 19448. MEISSER, O. Entwicklung eines magnetischen vertikalintensitätsvariometer mit einer induktionsspule als nullindikator (Development of a magnetic vertical intensity variometer with an induction coil as null indicator). (Reichsforschungsrat) (ALSOS Mission, RFR 507 26) Sep 1944. 2 p. Price: Microfilm - 50¢ - Photostat - $1.00
The report indicates that studies are planned for the coarse measurement of vertical component of the earth's magnetic field by means of permanent magnets and to obtain fine compensations by means of an additional induction coil field. The mechanical production of subject equipment has not been started. In German.

PB 20436. SIEMENS und HALSKE A. G., WERNERWERK. Der SRV messplatz (The SRV test station). 1941 - 1942. 52 p. Price: Microfilm - $1.00 - Photostat - $4.00
This contains a description and operating instructions for an equipment measuring the earth magnetic field strength and direction by means of three pairs of induction-coils, one pair for each direction, having as a core, a rod of highly permeable metal. As the permeability of this rod changes with the degree of its magnetization the resulting change of the impedance of the coils can be measured and calibrated as change of the earths magnetism by the use of Wheatston bridges and amplifiers. There are eight measuring bands allowing readings from .0025 to .500 oersted with a 98% accuracy. The report contains circuit diagrams and parts lists for the major components. In German.

PB 22710. TILGNER, FRANZ. Verfahren und anordnung zur durchführung übermikroskopischer beobachtungen (Method and arrangement to conduct ultra microscopic observations). German patent application T-60865 VIIIc/21g. Aug 1944 5 p. Price: Microfilm - 50¢ - Photostat - $1.00

PB 22711. TILGNER, FRANZ. Verfahren und einrichtung zur bestimmung von stoffen oder stoffzusammensetzungen (Method and device for the determination of materials and material compounds). German patent application T61014 IXb/421, Sep 28, 1944. 5 p. Price: Microfilm - 50¢ - Photostat - $1.00
This invention uses the fact that the velocity of electrons released by the X-ray treatment of a substance is proportional to the atomic weight of the substance. In a device similar to a cathode ray tube these electrons are then deflected by a constant magnetic field in proportion to their velocity; the electron beam of each substance appears as a line on the screen of the tube and can be calibrated as to the density of the material.

PB 9277. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. An einem ballon befestigtes hochfrequenzgerät. (A high frequency equipment on a balloon). German patent application T57263 VIIIa/21a[4]. Apr 25, 1942, still pending. Original inventor: Muth. 1942. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Equipment described is of the meteorological type. Illustrated.

PB 9278. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Antennensystem für ein von einem ballon getragenes sende-empfangsgerät (Antenna system for transmitter and receiver on balloons). German patent application T57262 VIIIa/21a[4]. Apr 25, 1942 still pending. Original inventors: Muth and Dr. Jaeckel. 1942. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
System described is for use on balloons of the meteorological type. Illustrated.

PB 9257. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung nach DRP..... (Anmeldung T 60 154 VIIIa/21 a 4) zur combination mehrerer elektrischer anzeigen. (An arrangement for combining several oscillograms). Additional German patent application to T60 154 VIIIa/21a[4]. Jan 23, 1945. Original inventor Dr. Gerhard. 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9270. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zur erzeugung von elektrischen impulsen. (An arrangement for generating electrical impulses). German patent application T57249 VIIIa/21a[3]. Apr 20, 1942, rejected. Original inventor: Dr. Graffunder. 1942. 5 p. Price: Microfilm-50¢ Photostat-$1.00
Illustrated.

PB 9265. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Stimmgabelgenerator. (A tuning fork oscillator). German patent application T57206 VIIIa/21a[4]. Apr 9, 1942, still pending. Original inventor: Moedebeck. 1942. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 19738. U. S. THIRD ARMY. SIGNAL SECTION. German frequency calibrator, Prüf G, SE 15b. (Enemy Equipment Intelligence Service Rept 8-45) Jul 1945. 5 p. Price: Microfilm - 50¢ - Photostat - $1.00
The instrument is used to calibrate the transmitter and receiver SE. 15b. One tube RV2.4P700, with its plate and screen tied together for use as a triode, is used in a crystal controlled oscillator circuit. The crystal has a frequency of 750 KC. Photographs and a wiring diagram are attached.

United States

PB 20512. FERNBACH, SIDNEY. The piezo gauge: Final report. (Frankford Arsenal Ordnance Lab Rept R-111) Jan 1942. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
The gauge consists of two quartz crystals and three steel sections, the crystals being sandwiched between the conductors. The entire stack is held together by a housing made of a good insulating material. The steel sections of the piezo electric gauge are made of 440 stainless (hardenable) steel and hardened. The details of the assembling, calibration and actual use of the gauge in measuring small arms chamber pressures are described in this report. The piezo electric gauge follows the true pressure more accurately and hence is a more dependable pressure measuring device. A section of the report is devoted to the pre-amplifier and calibration of the cathode ray oscillograph. The pre-amplifier consists of a single stage, a "38" tube used below rated values. Across the input is a variable condenser of known capacitance (0 to .06 microfarads in steps of .01) which is charged by the incoming pulse. The voltage input on the grid of the "38" is amplified and applied through a well-shielded lead to the input terminals of the cathode ray oscillograph. On the cathode ray tube screen are then produced the variations in voltage produced by the crystal charge on a known capacitance. Photographs, sectional and assembly drawings, graphs and diagrams are included.

PB 19782. MIHALYI, J. Short-base range finders. (OSRD Rept 6380) Nov 1945. 70 p. Price: Microfilm-$1.00 - Photostat-$5.00
The Eastman Kodak Company was authorized to undertake research and development in the general field of fire control. A considerable part of that research was in the field of optical instruments, particularly range finders. This report covers the development of a number of short-base range finders. The instruments were of several patterns and were for a wide variety of applications, among them: Infantry, field artillery, antiaircraft, and air corps. Particular attention was paid to features designed to facilitate use of the instruments in the field by untrained personnel, the most interesting single feature being the autocollimating principle. Specifications, photographs, and diagrams of the various instruments developed under this contract are included.

PB 19802. STEWART, J. E. Selective gas analyzers. (OSRD Rept 5004; NDRC 17.1:86) May 1945. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
This report covers the work done by Leeds and Northrup Company in the engineering and development of the Infrared Absorption Type Gas Analyzer devised by Prof. A. H. Pfund of Johns Hopkins University assisted by Mr. W. G. Fastie. These analyzers have functioned satisfactorily in studies of CO contamination in tanks and pillboxes and studies of ventilation and CO_2 concentration in submarines, and for other uses. Radiation from an infrared source is transmitted through the gas to be analyzed and percentage concentration is measured in terms of the amount of radiation absorbed by the gas. Requirements, theory of operation and development of Models IV, V, and VI for the measurement of CO, CO_2 and some other gases by spectral analysis, are given. Photographs, circuit and wiring diagrams, charts and drawings are included.

PB 18961. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Performance tests on light-weight high impact shock machine at Whippany, New Jersey. (NAVSHIPS 660, Rept S-660d) Sep 1944. 37 p. Price: Microfilm - 50¢ - Photostat - $3.00
Time-displacement measurements were made with loads on the 4A plate of the shock machine of from 0 to 500 pounds in increments of 100 pounds. These tests were made for blows delivered from the back, side and top of the anvil plate of the shock machine. The purpose of the tests was to determine the performance characteristics of the machine for various conditions of loading and to obtain performance data for comparison with the performance of other machines. Photographs, tables, graphs, and drawings are included.

PB 22238. U. S. WAR DEPARTMENT. Crystal rectifier test set TS-268/U. (Tech Manual 11-1242) Jun 7, 1945. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
Crystal rectifier test set TS-268/U is designed to make speedy qualitative tests on specific types of high-frequency crystal rectifier. It measures the forward and backward resistance of the crystal under test in order to obtain a ratio which indicates quality. The condition of the crystal rectifier can also be determined by measuring the current flow through the crystal in the backward direction. Operating and maintenance instructions are given in this manual, which is illustrated with photographs and diagrams.

PB 22356. U. S. WAR DEPARTMENT. Meter test equipment AN/GSM-1. (Tech Manual 11-2535) May 1945. 80 p. Price: Microfilm - $1.00 - Photostat - $6.00
This instruction manual describes the components of the subject test equipment and their use. This equipment is provided for use by Signal Corps repair personnel in repair depots and base maintenance companies. The equipment is portable and self-contained, and may be carried in a truck. It is designed to provide a means for testing and calibrating meters, except wattmeters, used as electronic measuring devices by the Signal Corps. The principal components are: Voltage supply unit; current supply unit; voltmeter standards unit; ammeter standard unit; test set I-49, a Wheatstone bridge; test set I-56-K, for making resistance and voltage measurements and to check vacuum tubes; magnet charger; and frequency meter. Photographs and diagrams illustrate the manual.

PB 22194. U. S. WAR DEPARTMENT. Test set AN/MPM-2; and addenda, dated Feb 26, 1945. (Tech Manual 11-1211) Feb 1945. 91 p. Price: Microfilm - $1.00 - Photostat - $7.00
Test set AN/MPM-2 consists of the special test equipment for radio set SCR-584 and radio equipment RC-184. When the equipment included in this test set is used in conjunction with test set AN/GPM-1, all equipment necessary for third echelon maintenance is available. Complete information on the major test instruments included in the set may be found in the technical manuals covering the individual instruments. These instruments include fluxmeter, power meter, range calibrator, signal generator, plan position rectifier, etc. There are photographs and drawings.

PB 22193. U. S. WAR DEPARTMENT. Test set AN/MPM-3 (Tech Manual 11-1230) Mar 1945. 27 p. Price: Microfilm - 50¢ - Photostat - $2.00
Test set AN/MPM-3, used in conjunction with test set AN/GPM-1 (see TM 11-1080), furnishes the test equipment required for third echelon maintenance of radar set SCR-545-A and radar equipment RC-145-A. This manual presents general information on each individual component. Other manuals give detailed coverage of the separate components. Photographs are included.

PB 22213. U.S. WAR DEPARTMENT. Test set I-153-A; analyzer, Precision model 856P. (Tech Manual 11-2532) Dec 1944. 35 p. Price: Microfilm - 50¢ - Photostat - $3.00
The Precision model 856P analyzer is a test instrument of high sensitivity for making accurate measurements of a-c and d-c voltages, resistances, decibels, output voltages, and d-c currents in 44 ranges. It also provides for making qualitative tests on paper and mica capacitors and current leakage tests on elpctrolytic capacitors. The instrument incorporates a 20,000-ohms-per-volt sensitivity for making reliable measurements in high-resistance circuits, and a 1,000-ohms-per-volt sensitivity. Operation, functioning of parts, and maintenance are described in this manual. Photographs, circuit and schematic diagrams are included.

PB 22206. U. S. WAR DEPARTMENT. Test set I-179. (Tech Manual 11-2600) Nov 1944. 42 p. Price: Microfilm - 50¢ - Photostat - $3.00
Test set I-179 is a service instrument designed to cover a wide range of voltage, current, and resistance measurements. Voltage measurements can be made at either of two separate meter sensitivities: 1000 ohms per volt or 20,000 ohms per volt. In general, results are accurate to within 3% on d-c measurements and within 5% on a-c measurements. This manual contains description and instructions for the use of the set. Photographs and diagrams are included.

PB 22220. U. S. WAR DEPARTMENT. Test sets EE-65 and EE-65-A through E. (Tech Manual 11-361) Feb 1943. 41 p. Price: Microfilm - 50¢ - Photostat - $3.00
Test sets EE-65 and EE-65A, -B, -C, -D, and -E have been designed to provide a wire chief's testing equipment in a compact portable form for use both in the field and in permanent central office installations. Each of the test sets contains equipment for talking, signalling, and testing wire line installations. The test circuits of each of these sets is fundamentally the same electrically, although later models incorporate minor improvements. The manual contains sections on description employment, functioning of parts and circuits, maintenance, and supplementary data. There are photographs diagrams, and a parts list.

PB 22202. U. S. WAR DEPARTMENT. Tube tester Espey model 105. (Tech Manual 11-2516) Oct 1944. 44 p. Price: Microfilm - 50¢ - Photostat - $3.00
This instrument has been designed for the purpose of testing standard receiving tubes and some small transmitting tubes. Radio tubes with characteristics usually regarded as standard may also be tested if the variations found are taken into consideration. This instruction manual also contains photographs and schematic diagrams.

PB 22072. U. S. WAR DEPARTMENT. Vacuum tube voltmeter, Precision model EV-10-MCP. (Tech Manual 11-2653) Jul 1945. 83 p. Price: Microfilm-$1.00 - Photostat-$6.00
This instruction manual describes a combination test instrument designed to measure voltage, current, and resistance. All measurements are registered on a single, multiscaled meter. It is accurate to 3% for dc and 5% for a-c readings. Photographs and diagrams are included.

PB 22255. U. S. WAR DEPARTMENT. Voltmeter TS-363/U. (Tech Manual 11-1239) Mar 17, 1945. 41 p. Price: Microfilm-50¢ - Photostat-$3.00
This instruction manual describes a vacuum tube voltmeter designed to measure a-c and d-c voltages up to 100 volts. The instrument is designed for operation from a 115-volt, 60-cycle, a-c line. It is basically a d-c amplifier used for both d-c and a-c measurements, and a probe rectifier which is used only for a-c measurements. The voltmeter is used in making voltage measurements in high-impedance circuits, where ordinary meters cannot be used because of excessive current drawn from the circuit under test and because of errors at high frequencies. R-f voltages at frequencies as high as 150 mc can be measured. Photographs and diagrams are included.

PB 22073. U. S. WAR DEPARTMENT. Voltohmmeters TS-294/U and TS-294B/U. (Tech Manual 11-2624B) Apr 30, 1945. 45 p. Price: Microfilm-50¢ - Photostat-$ 3.00
The instruments described in this instruction manual will measure a-c and d-c voltage and resistance of vacuum tubes over a wide range. Each instrument consists basically of a 200-microampere d-c meter, a d-c amplifier, a copper-oxide rectifier, a 3-volt battery, and a power supply. Photographs and schematic diagrams are included.

PB 21940. U. S. WAR DEPARTMENT. SIGNAL CORPS. Alignment equipment ME 73. (Tech Manual 11-318) Jul 1943. 33 p. Price: Microfilm - 50¢ - Photostat - $3.00
This equipment consists of instruments and tools to be used with Adapters M-394 and M-399 to adjust and align Radio Sets SCR-509, SCR-510, SCR-609, and SCR-610. A description of and installation instructions for these adapters and alignment procedures are given. Illustrations and wiring diagram included.

PB 21939. U. S. WAR DEPARTMENT. SIGNAL CORPS. Plotting equipment AN/TSA-2. (Tech Manual 11-2582) Jun 1945. 24 p. Price: Microfilm - 50¢ - Photostat - $2.00
This plotting equipment consists of two portable plotting tables, a clock, various colored paints, and other items needed to plot flights of friendly and hostile aircraft. The equipment is packed in the under side of the plotting tables. It is used for displaying intelligence concerning aerial activities, and for an antiaircraft operations room in conjunction with telephone and radio equipment. Installation, and assembly, operating instructions, maintenance and repair are covered in this illustrated manual.

PB 21976. U. S. WAR DEPARTMENT. SIGNAL CORPS. Test set I-157-A; Tube and set tester, precision model 920P. (Tech Manual 11-1209) Nov 1944. 47 p. Price: Microfilm - 50¢ - Photostat - $4.00
This manual describes this instrument well as the functioning of its parts, and gives operating and maitenance instructions. It is a push-button-operated radio tube tester combined with a rotary range-selector system for obtaining measurements of a-c and d-c voltages, resistance, decibels and d-c currents on 33 ranges. It also provides a direct-reading test for batteries, a test for pilot lights and a system for obtaining qualitative analysis of mica, paper, and electrolytic capacitors. The tube-analyzer circuit checks in one operation mutual conductance and cathode emission of a radio tube. An automatic, interlocking, push-button element selector, incorporated in the analyzer, provides for simplicity of operation, visible filament-continuity tests, quick inter element short checks, cathode leakage checks, and rapid location of all tube elements for the application of individual test voltages. Parts list, photographs, and schematic diagrams included.

PB 21977. U. S. WAR DEPARTMENT. SIGNAL CORPS. Test set AN/MPM-5. (Tech Manual 11-1221) Apr 1945. 33 p. Price: Microfilm - 50¢ - Photostat - $3.00
This illustrated manual describes the special test equipment for radar sets SCR-582A, SCR-582-T6, and SCR-682-A, and for radar equipments RC-182-A and RC-282-A. When used in conjunction with Test Set AN/GPM-1, all equipment necessary for third echelon maintenance is available. It is carried in two wooden chests mounted on shock-mounted bases in the van which carries Test Set AN-GPM-1. Power can be obtained from Power Unit PE-95, a commercial source, or 6-, 12- and 24- volt d-c power from batteries supplied.

PB 27561. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for TS-7/ASQ magnetic compensator. (CO-AN-08-35TS7-2K) Oct 1944. 42 p. Price: Microfilm-$1.00 - Photostat-$3.00
This instrument is designed especially to compensate for the permanent magnetic fields that may be present in the airplane in connection with the operation of the 4B2, AN/ASQ-1 and AN/ASQ-2 series magnetic airborne detectors. Permanent magnets enclosed in solenoids are mounted in suitable locations in the airplane's structure and power from the airplane's source of supply is connected to these solenoids through the control unit and junction boxes of the compensator system. Reversal of the polarity of the current supplied to the coils and control of the amount is accomplished by manipulating of controls. By properly adjusting the strength and direction of the magnetic field of each of these permanent magnets, compensation is effected. A list of the component equipment is followed by instructions for the installation, adjustment, operation and maintenance of the equipment and its components. Photographs, drawings, circuit diagrams, graphs and parts lists are included.

PB 27563. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT, and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for model TS-8A/U oscilloscope calibrator. (AN-08-35TS8-2) Jul 1944. 36 p. Price: Microfilm-$1.00 - Photostat-$3.00
This is an electrical instrument designed to serve as an adjunct to the Cathode Ray Oscilloscope. It is a device by which are measured the values of the voltage of the recurrent or transient wave forms shown on the oscilloscope. It may also be used as a signal generator providing that the input impedance of the device into which the calibrator is supplying the signal be not less than 500,000 ohms. The calibrator is designed to operate from a 110 volt, a-c, 60-cycle power outlet with an average power consumption of 35 watts. This equipment is one of the test instruments used in conjunction with type 4B2 MAD equipment. A general description of the instrument and the theory of operation are followed by instructions for its installation, adjustment, operation and maintenance. Photographs, drawings, charts, diagrams and a parts list are included.

PB 27562. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for TS-9A/ASQ tube tester. (AN 08-35TS9-2) Jul 1944. 41 p. Price: Microfilm-$1.00 - Photostat-$3.00
The purpose of this instrument is to serve as a tester of vacuum tubes used in the 4B2, AN/ASQ-1 and AN/ASQ-2 series airborne detection equipment. The Vacuum Tube Voltmeter section of this instrument may also be used for the measurement of external voltages, both a-c and d-c, within the range for which it is designed. The tube tester is designed to operate from a 110 volt, 60 cycle, a-c power outlet, with an average power consumption of 75 watts. A description of the instrument and its uses is followed by instructions for its installation and adjustment, operation and maintenance. Photographs, drawings, diagrams, tables and a parts list are included.

PB 27558. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of operating instructions for AN/ASQ-1 and AN/ASQ-1A equipment. (AN-08-10-198) Sep 1943. 59 p. Price: Microfilm-$2.00 - Photostat-$4.00
This is an installation manual for trained equipment specialists and an operating manual for unskilled pilots and crew members. The equipment components of these magnetic airborne detectors are indicated for each model, including the head unit, oscillator, amplifier, dynamotor, recorder, junction box, remote indicating meter, plugs, cables, connectors and mounts. Auxiliary material which is not specified in this manual is required for use with this equipment. Instructions are given for the installation and operation of the equipment and its components. Theory of operation and maintenance are not covered. Photographs, assembly drawings and wiring diagrams are included.

PB 27559. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT, and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of operating instructions for model AN/ASQ-3A equipment. (AN-08-10-252) Jan 1944. 43 p. Price: Microfilm-$1.00 - Photostat-$3.00
This magnetic airborne detector equipment consists of several units, including an oscillator, dynamotor assembly, control box, indicators, and a recorder which are interconnected by means of cables. Certain items of the equipment are installed permanently in the aircraft plant. The rest of the equipment is installed at the base. A list and description of the component equipment is followed by instructions for the installation and adjustment, operation and emergency repair of the unit and its components. Photographs, drawings, wiring diagrams and tables are included.

LEATHER AND LEATHER PRODUCTS

PB 20279. GREENE, H. S. Sterilization of used army shoes. Progress report. (OSRD Rept 3118) Jan 1944. 27 p. Price: Microfilm - 50¢ - Photostat - $2.00

A number of solutions have been tested for the destruction of the Tricophyta (athlete's foot organisms) on used army shoes. The most effective of these is a 1% aqueous solution of formaldehyde. It has been demonstrated that such a solution will kill all Trichophyta on shoes in five minutes or less. The method of treating the shoes with this aqueous solution of formaldehyde, washing with a 0.3 percent soap solution, rinsing, and treating with an emulsion for relubrication and mold resistance is described in this report. Discussion is also included on the treatment with alkaline hypochlorite solution which was found to be ineffective, on the removal of formaldehyde from leather, on miscellaneous investigations for controlling the pH of leather, and on the toxicity of processed leather.

PB 20281. GREENE, HOKE S. and LOLLAR, ROBERT M. Preservatives in Army dubbings. Progress report. (OSRD Rept 3120) Jan 1944. 20 p. Price: Microfilm - 50¢ - Photostat - $2.00

A study of the use of dubbing carrying preservatives for the protection of leather against molds and mildew is presented in this report. Particular attention is given to the protection of Army shoe upper leather. Because of being a chrome re-tan leather of high grease content with, consequently, a lowered water absorption, Army shoe upper leather is normally relatively resistant to mold growth. Moreover, grain-finished leather is usually more resistant than flesh-finished leather. Para-nitro-phenol, para-chloro-meta-xylenol, penta-chloro-phenol, and tetra-chloro-phenol have been shown to be very effective when used in dubbings. The following mixture is recommended: 0.8% para-nitro-phenol, 0.8% para-chloro-meta-xylenol and 0.8% tetra-chloro-phenol. Discussion of results and tabulated data showing results of tests of various preservatives are included.

PB 20280. LOLLAR, ROBERT M. Mold resistant treatments for leathers. Progress report. (OSRD Rept 3119) Jan 1944. 25 p. Price: Microfilm - 50¢ - Photostat - $2.00

A comparison was made in the investigation reported herein of various mold and mildew preventive agents for leather. As a result of tests made, the general efficiency of salicyl anilide, penta-chlorophenol, para-chloro-meta-xylenol, 2-mercapto-benzo-thiazole, 2-2'di-chloro 5-5' di-hydroxy diphenyl methane, 2-4-5 tri-chloro-phenol, tetra-chloro-phenol, and para-nitro-phenol, is demonstrated. This report includes discussion of the correlation of this investigation with earlier studies, experimental procedure employed, efficiency of various preservatives tested, the selection of a preservative, and practical application of information regarding preservatives. Tables showing the results of tests with various preservatives are included.

PB 20283. LOLLAR, ROBERT M. Report on toxicity studies on preservative bearing leather. (OSRD Rept 3260) n.d. 14 p. Price: Microfilm - 50¢ - Photostat - $1.00

Studies were made at the University of Cincinnati on dogs and horses to determine if dog collars and harnesses made of leathers which had been treated with preservatives were toxic to these animals. Based on the studies reported herein it would seem that leather carrying between 0.25 and 0.50 percent of penta-chloro-phenol, para nitro-phenol, salicyl anilide, chloro-symmetrical-xylenol, 2, 4, 5 trichloro-phenol, tetra-chloro-phenol, 2-mercapto-benzo-thiazole, 2,2'di-chloro 5,5' di-hydroxy di-phenyl methane, and mixtures thereof, would be safe for use on these animals and possessed of good mold and mildew resistance. Formulae and tables showing results of test with various preservatives accompany the descriptions of the tests.

PB 21128. O'FLAHERTY, FRED and others. Improvement of leather for military uses: Progress report to Mar 15, 1943. (OSRD Rept 2077) Nov 1943. 198 p. Price: Microfilm-$2.00 - Photostat-$14.00

This progress report contains a complete summary of all the work done under NDRC contract with the University of Cincinnati for the first six months ending March 15, 1943. Report I, entitled "A study and the development of a mold resistant treatment for leather", by Robert M. Lollar, evaluates preservatives for leather for tropical use. Based upon these laboratory experimental results, field trials of leathers containing 0.5% paranitrophenol or parachlorometaxylenol or mixtures thereof were recommended. Further research was outlined. A report on "Preservatives in army dubbings", by Hoke S. Greene and Robert M. Lollar, evaluates the use of certain preservatives in dubbings. 0.5 percent paranitrophenol, 1.0 percent parachlorometaxylenol, or 1.5 percent tetrachlorophenol in dubbing had protected leather for six weeks. However, a mixture of preservatives would be more effective than any one alone. The use of 0.4 percent each of the three preservatives was suggested for trial. An investigation was conducted on cut soles to determine their uniformity, resistance to abrasion and chemical composition, and information presented in "Abrasion tests on cut sole leather", by William T. Roddy and Domingo B. Gapus. Sole sorting was shown to be in error, especially in soles from the better portion of the bend leather. Test results indicate that there is a direct relation between the weight and thickness indices. "The potential wear of army sole leather", by William T. Roddy and others, presents a comparison of indices of abrasion to chemical composition. "The influence of soil solutions on the wear of vegetable tanned sole leather," by Raymond L. Moore, covers some experimental work to determine the chemistry of various soils which may influence wear of military sole leather, the influence of soil alkalinity or low acid conditions on leather, and the evaluation of the more common vegetable tanning materials for their ability to resist soil solution deterioration. Experimental data presented in "The impregnation of vegetable sole leather with synthetic resins as a means of improving wear", by J. G. Niedercorn and F. D. Thayer, indicate that the abrasive resistance of vegetable sole leather can be increased by impregnation with synthetic resins. The deposition of 6% of resin based upon the air-dry weight of the leather increased the abrasion resistance about 20%. "The study of disinfection methods on used shoes", by H. Greene, appears in revised form under the title "Sterilization of used army shoe leather; Progress report to Feb 15, 1943" (PB 21128). In "The development of new synthetic tanning agents for heavy leather", by J. H. Highberger and A. H. Bump, possible factors involved in the influence of the tanning agent on the wear resistance of sole leather are considered, and methods of work, materials and processes are discussed. Based upon laboratory experimentation only, Robert Lollar reports in "Chrome tannage of vegetable sole leather as a means of improving wear", that a correct combination of chrome tannage following vegetable tannage can increase the abrasive resistance of sole leather about 30%. Tables and graphs illustrate "A study of the effect of oils, greases and waxes on the performance of impregnated vegetable sole leather", by Robert M. Koppenhoefer and Ricardo P. Hermoso.

PB 20278. RODDY, WILLIAM T. and GAPUZ, DOMINGO B. Influence of oils on shoe leathers: Behavior of oil treated leather at cold and hot temperatures. Progress report. (OSRD Rept 3117) Jan 1944. 50 p. Price: Microfilm - 50¢ - Photostat - $4.00

The investigation described in this report was conducted to determine the influence of oils on calf skin leathers at cold and hot temperatures and thus to determine the most suitable leather for use in military shoes to be worn in sub-arctic temperatures, and also how the same leathers would behave when worn at hot temperatures. Two types of calf skins were used, one set being prepared in the laboratory and the other obtained from a tannery. Physical tests were conducted on all of the leather samples after treatment to determine the influence of the oil treatments. The results obtained show that the part of the skin from which the leather comes, in almost all cases, has greater influence on the physical characteristics of leathers than oil treatments. The results also show that cod oil and certain mineral oils produce a more flexible leather at

cold temperatures than neatsfoot oil. If neatsfoot oil is mixed with a low viscosity mineral oil the leather becomes more flexible at cold temperatures.

MACHINERY (EXCEPT ELECTRICAL)

PB 22820. BARTOL, J. A. Experimental Diesel engine at Motorenwerke Mannheim. (Naval Tech Mission in Europe Tech Rept 377-45) Sep 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
The Motorenwerke plant at Mannheim was visited for examination of an experimental Diesel engine. The engine was a 12 cylinder, 4 cycle, V-type, supercharged Diesel developing 2000 hp. at 750 RPM. In general the design is not radically new, although several details are novel.

PB 19406. DEUMAG MASCHINENFABRIK, ESSLINGEN. Der 1000 kilogramm stampfer (The 1000 Kg press). n.d. 33 p. Price: Microfilm-50¢ - Photostat-$3.00
This material consists of 19 German Assembly drawings for a 1000 kg. press.

PB 17374. JUNKER, OTTO, LAMMERSDORF. Photos of electric furnaces and equipment. (MIS VII 67 g 7000323) n. d. 62 p. Price: Microfilm-$1.00 - Photostat-$5.00
This binder contains 62 photographs of electric furnaces, ingot molds, lathes, milling machines, and various other machines to be used in working up metals.

PB 21836. TOUR, SAM. Heavy equipment for metal working. (FIAT Final Rept 598) Dec 1945. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
This investigation report covers equipment used in aluminum extruding, rolling and forging in Germany. It was evident that the greatest advances were represented by the new and larger items of equipment built or being built for these operations. It was known that one 30,000 ton die forging press, two 15,000 ton die forging presses, and at least one 12,000 ton extrusion press had been built. Several hundreds of drawings of these presses, hammers, and stretching machines plus rolling mills were finally obtained from the designer Schloemann A.G., Düsseldorf, Germany, but they are not included in this report; they were turned over to one Mr. E. Loewy, and may have been shipped to The Air Service Technical Command at Wright Field U.S.A. Schloemann A.G. is a large engineering and designing firm with no manufacturing facilities of their own. All manufacturing of presses and rolling mills designed by them is done on a sub-contract basis with many plants throughout Germany. One photograph and five odd drawings are attached. The drawings identified are of molds for press and rolling bars.

MEDICAL RESEARCH AND PRACTICE, INCLUDING CLINICAL APPLICATION OF DRUGS AND PHARMACEUTICALS

PB 20737. FISHER, R. A. Glossary of pathological terms and technical toxicological expressions. (Edgewood Arsenal Chemical Div Rept 105) Feb 1922. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
The Toxicological Department, Edgewood Arsenal had made a thorough search of the British, French and American war gas literature, from the standpoint of the toxicological properties of several of the most important war gases. Reports were made, based on this data. It seemed advisable, therefore, to accompany those reports with this glossary of the common pathological terms, together with a brief definition of some of the technical expressions and a brief description of the most common methods employed in this kind of research.

PB 20792. GILMAN, ALFRED and others. The metabolic reduction and nephrotoxic action of tetrathionate in relation to a possible interaction with sulfhydryl compounds. n. d. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
Tetrathionate is rapidly reduced to thiosulfate in vivo, also, it is toxic to the renal tubule to a degree that moderate doses produce complete anuria within less than an hour. This report is concerned with the mechanism by which the reduction of tetrathionate can be effected in vivo and its possible relationship to the nephrotoxic action. Tables appear throughout the report. Bibliography is included.

PB 20793. KAREL, LEONARD. The inhibition and potentiation of cellular agglutination by ricin, with a note on the toxicity of special preparations of ricin in mice. n. d. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
The report presents data indicating that agglutination of corpuscles in vivo cannot account for the toxicity of ricin, inasmuch as not enough red blood cells are destroyed to produce toxic effects; that, although immediate agglutination of erythrocylis and other cells by mixtures of serum, whole-blood, or lecithin and ricin is prevented, delayed agglutination does occur after sufficient incubation at body temperatures, and that ricin, treated with serum, increases in absolute toxicity, whereas lecithinized ricin, similarly treated, does not. All data reported are composite results of repeated determinations. Tables appear throughout the report. Bibliography is included.

PB 20794. KAREL, LEONARD and FRANKLIN, RICHARD C. The quantitative determination of ricin hemagglutination. n. d. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
This study was undertaken to attempt to establish a quantitative relationship between hemagglutination and ricin content as a means of determining the latter in the extremely low concentrations in which it is toxic. In the course of the work, the sensitivity of erythrocytes to ricin was found greatly to exceed expectations. A quantitative relationship in the agglutination of guinea pig erythrocytes by ricin has been established. Standard deviation was found to be ±5.58 percent with amounts as small as 1.0 microgram. Quantities of ricin as low as 10-12 micrograms have been detected. Table, bibliography, and graphs are attached.

PB 18767. U. S. WAR DEPARTMENT. MEDICAL CORPS. Neurotropic virus diseases. (Tech Bulletin MED 212) Jan 1946. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
The subject matter has been divided as follows: Introduction, classification and diagnostic features of principal neurotropic virus diseases; St. Louis Encephalitis, Japanese B Encephalitis, Russian Spring-Summer Encephalitis, Eastern Equine Encephalomyelitis, Western Equine Encephalomyelitis, Symphocytic Choriomeningitis, Poliomyelitis and Mumps Meningoencephalitis. Other divisions are - less common infections of central nervous system, diagnostic procedures, and the collection and shipment of specimens.

PB 20790. WESTON, RAYMOND E. and KAREL, LEONARD. Studies in the toxicology of phosgene: V. The prophylactic effect of hexamethylenetetramine in dogs exposed to phosgene. n. d. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
As the HMT dose was decreased, its prophylatic effect against phosgene poisoning diminished; however, at each HMT dosage the difference between the mortality of treated and untreated animals is statistically highly significant. The increase in mortality with decrease in HMT dose in suggestive of a quantitative relationship between the effective prophylactic dose of HMT and the concentration and dose of phosgene to which the animal is exposed. Bibliography and tables attached.

METALS AND METAL PRODUCTS

German

PB 22388. BARTHOLOMEW, H. L., JR. and others. Examination of enemy materiel (OD-113; AC-77; M-119): Metallurgical investigation of German 170 mm. gun. Progress report 103. Oct 30, 1944. (OSRD Rept 4463) Dec 1944. 47 p. Price: Microfilm-50¢ - Photostat-$4.00
This report describes the examination, at Massachusetts Institute of Technology, of a 170 mm. German gun, including tube, jacket, breech ring, locking collar and breechblock, to determine the method of manufacture, chemical composition, and the mechanical and metallurgical properties. The gun tube and jacket are forgings, the breechblock is a casting, the breech ring is a casting having some forging of the threaded portion. The method of manufacture of the locking collar cannot be conclusively stated; it has however been nitrided. The mechanical properties of all components are good, with the exception of low impact strength of the tube. A discussion of the procedure is followed by tables giving the markings found on the gun, chemical composition of the samples, hardness survey, tensile properties, and V-notch Charpy impact tests at 80° F. and at low temperature. Photographs, photomicrographs and drawings are included.

PB 17389. GERMANY. DEUTSCHE REICHSBAHN-GESELLSCHAFT. Technische lieferbedingungen für flussstahl, geschmiedet oder gewalzt, unlegiert (Technical specifications for ingot steel, forged or rolled, unalloyed). (MIS 67z 7002639) n.d. 4 p. Price: Microfilm - 50¢ - Photostat - $1.00
These specifications of the German Railways are divided into two groups: 1. Nature of the material with special attention to steel for construction of machines (including parts for superstructure and bridges), case-hardened steel, and strengthened steel 2. Quality control. In German.

PB 22502. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): Examination of ten rounds of German 20 mm H. E. ammunition. Progress report 45. (OSRD Rept 3417; War Metallurgy Committee Rept M-241) Mar 1944. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
A metallurgical and chemical examination has been made on ten rounds of German 20 mm high explosive ammunition, manufactured in 1935-1942. On the rounds manufactured up until 1941, the cartridge cases were made from 70030 brass, the fuses from leaded 60-40 brass, and the projectiles from medium plain carbon steel (0.50-0.60%C.). The brass cartridge cases were made by conventional methods of deep drawing and showed no special features of interest. The projectiles were machined from bar stock and were of conventional design; the rotating bands were made from sections of commercial copper tubing. On the rounds manufactured in 1941-1942, however, the cartridge cases were made from low-carbon steel by deep drawing, the fuses from duralumin, and the rotating bands from sintered iron. The steel cartridge cases were covered on both surfaces with a well-adhering lacquer. One projectile, made in 1942, was of a novel, thin-wall design, permitting a higher explosive charge capacity than is usually to be found in 20 mm high explosive projectiles. Unlike the conventional thick-wall 20 mm projectiles which are machined from plain-carbon steel bar stock, this thin-wall projectile was hot-drawn from a chromium-molybdenum steel. The metallurgical data were consistent with what one would expect in the type of materials investigated. Photographs and tables of test data appear in the appendix.

PB 22537. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of two German MG-151 aircraft machine gun mounts. Progress report 116, Aug 28, 1944. (OSRD Rept 4214; War Metallurgy Committee Rept M-383) Oct 1944. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
It is apparent from the use of cast magnesium frames and housing that these mounts were designed primarily for lightness. Sand cast magnesium alloys were of the German Elektron AZ-9 type. Aluminum parts were fabricated from the Swiss Anticorodal (T) alloy which is commonly used for tubing and extrusions. This alloy closely approximates ALCOA 48. The steels, with the exception of some low and medium-carbon 13-16% chromium steels in the snubber tubes, showed nothing unusual. The high chromium alloys would fall in the range of our cutlery steels. The heat treatment was conventional. The black paint coatings on the magnesium sand castings were of two types: a nitrocellulose lacquer vehicle with an iron oxide base primer and lampblack pigment; and a phenolic resin vehicle, no primer, and lampblack pigment. Workmanship was excellent throughout in the quality of casting formed pieces and machining. Photographs and tables appear in the appendix.

PB 18264. GUTEHOFFNUNGSHÜTTE, OBERHAUSEN. Schaubilder über dauerfestigkeit. (Graphs about fatigue strength of steels). (MIS VII 70a 7002442) Jun 1937. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
This report consists of eleven graphs showing endurance of steel, alternated bending resistance of steel, endurance of steel bars plain or slotted, primary strength of steel, effect of rolling on the alternated bending resistance of steel, alternated bending resistance of steel plates 5mm., 10 mm., and 12 mm.

PB 14582. MATTHAES, K. Hochfeste flugzeugstähle. (High strength steel for aircraft). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik II C 15) (Alsos Mission, Klotter File 11 B) May 15, 1940. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
This is one of a series of pamphlets in German published by the German Air Ministry. High strength steel and various steel alloys to be used in aircraft construction are studied. The strength, temper, and other useful properties of different types are discussed. The report analyzes possible uses of steel alloys in aircraft parts. Tables, graphs, photographs, drawings, and bibliography are included.

PB 14731. MÖLLER, H. and HEMPEL, M. Röntgenbild und zugschwellfestigkeit geschweisster proben. (X-ray picture and tensile impact strength of welded test pieces). (Kaiser Wilhelm Institut für Eisenforschung) (ALSOS Mission Hoyt File 24) May 29, 1945. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This study describes tests on welded test pieces which proved that welding defects in the degree as shown in the X-ray picture method were also found defective in the same degree in the tensile impact test method. In German.

PB 18269. PHOTOS of iron and steel producing plants. (MIS VII 67g 7002136) n. d. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
This report consists of twenty-four photographs of various iron and steel plants in Germany.

PB 14585. STEUDEL, H. Zerstörungsfreie werkstoffprüfung im flugzeug und -motorenbau. (Testing motor and aircraft materials without damage to the tested parts). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik II C 19). (Alsos Mission, Klotter File 11 B) Nov 30, 1939. 40 p. Price: Microfilm-50¢ - Photostat-$3.00
This publication is one of a series of pamphlets published by the German Air Ministry. Methods permitting the testing or examination of specimens without injury to the materials are described. Physical tests include optical, electromagnetic, X-ray, and others. Other tests, such as chemical, spectroscopic are also used. There are also tests, which while not completely damage free, are still very useful. Test instruments are illustrated and principles of their operation are explained. Graphs, drawings, tables, photographs, and a bibliography are included.

PB 22827. WRIGHT, R. T. Material and placement of German rotating bands. (Naval Tech Mission in Europe Tech Rept 394-45) Aug 1945. 11 p. Price: Microfilm - 50¢ - Photostat - $1.00
This report covers results of German replacement of copper rotating bands by various materials - soft iron, sintered iron and bimetallic bands, and their effects on gun life. The symbol KPS designates the earliest substitute rotating band, Krupp Sparführung, and refers to a bimetallic rotating band of copper clad steel. The symbol WEW stands for Weicheisen or soft iron. This is a low carbon, nearly pure iron. German scientific personnel stated that the nearest commercial equivalent to WEW was the American Armco ingot iron. The symbol WES stands for "Sinter-Eisen" or sintered iron driving bands. These proved to be the most acceptable substitute for the copper bands and possess certain advantages over copper. Representative drawings of all types of German rotating bands and band scores were transmitted in restricted letter, serial No. 857, dated Aug 27, 1945, from the U. S. Naval Technical Mission in Europe to CNO (OP-16-P7).

Japanese

PB 22900. BARTHOLOMEW, H. L., JR. and others. Examination of enemy materiel (OD-113) (AC-77) (M-119): Metallurgical investigation of an 8 cm Japanese anti aircraft gun. Progress report. (OSRD Rept 5323; War Metallurgy Committee Rept M-552) Jul 1945. 43 p. Price: Microfilm - 50¢ - Photostat - $3.00
The examination of the tube, sleeves, steel jacket, bronze outer jacket, breech ring and breech block of the above named gun, dated 1942, was made at the Massachusetts Institute of Technology to determine the metallurgical and mechanical properties, chemical analysis and method of manufacture. Examination included visual examination, chemical analysis, Jominy hardenability, hardness surveys, analysis of tensile and impact properties, macroscopic and microscopic examination. It was found that all gun components of steel were forgings having comparatively low strengths in keeping with a low carbon, high nickel type analysis. The breech sleeve section and steel jacket possessed low impact strengths. The bronze jacket was a poor quality sand casting. Discussion of the findings is accompanied by photographs, drawings, tabulated data, photomicrographs, and graphs.

United States

PB 19516. BALLASTUS, A. C. Formability of magnesium alloy sheet, Progress report: Jan 15, 1943 - Apr 10, 1943. (OSRD Rept 1485; War Metallurgy Committee Rept M-65) May 1943. 17 p. Price: Microfilm - 50¢ - Photostat - $2.00
This is the first quarterly report of experiments undertaken at the University of California, to provide, primarily to aircraft manufacturers, fundamental data relating to the plastic properties and forming of commercially available magnesium alloy sheet. Slowness in the receipt of equipment prevented any experimental work. This report outlines the program of experiments, presents an analysis of forming operations and describes the equipment to be used including various magnesium alloys, a variable temperature tensile testing machine, a Guerin press, and a draw press. Included are detailed drawings of the equipment and a bibliography.

PB 18873. BRIDGMAN, P. W. Plastic deformation of steel under high pressure: Third progress report. (OSRD Rept 1868; NDRC Armor and Ordnance Rept A-218) Sep 1943. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
The tests of mechanical properties of steels under high hydrostatic pressure which were described in the first and second report on this subject (OSRD Reports 919 and 1347) were continued, using four samples of armor plate of varying ballistic qualities. The conclusion, in accord with the results of other lines of investigation, is that ballistic behavior is closely associated with fairly obvious characteristics, such as inhomogeneity, brittleness, and so forth, which can be investigated by standard methods. The conclusions regarding strain hardening and conditions for fracture, given in the earlier reports, have been improved, but not essentially changed, by considering the true stress state in the neck of a tensile specimen.

PB 18877. BRIDGMAN, P. W. The plastic properties of steel under large strains and high stresses. Final report. (OSRD Rept 4256; NDRC Armor and Ordnance Rept A-294) Oct 1944. 74 p. Price: Microfilm-$1.00 - Photostat-$5.00
In this final report on the above subject new experimental material is presented for the effect of hydrostatic pressures up to 30,000 kg/cm^2 on the tensile properties of a 0.45C and a 0.90C steel in eight different heat-treatments, of a 0.34C and a 0.68C steel in the "as received" condition, and of four special plates submitted by the Navy. In addition, a beginning has been made on a study of the effect of hydrostatic pressure on plastic yield in simple compression, and the effect of hydrostatic pressure on the behavior of three heat treatments of two steels under punching forces has been studied. Test data for this part of the study are presented in graphs and tables. A summary covers all of the work done under this contract.

PB 19823. DE FOREST, A. V. and SHEPLER, P. R. Investigation of factors reducing the effective ductility of welded steel members. Final report, Nov 1, 1943 - Nov 15, 1944. (OSRD Rept 4647; War Metallurgy Committee Rept M-432) Feb 1945. 51 p. Price: Microfilm - $1.00-Photostat - $4.00
This investigation carried out by the Massachusetts Institute of Technology was divided into two types of testing: (1) Notch bar bending tests on specimens of 1" x 1" cross section and 6" long; and (2) dropping weight impact testing on specimens 1" x 4" cross section and 12" long. The purpose of both tests was to determine the temperature of brittle failure at a particular speed of loading for ship plate material and then for welded material. It has long been recognized that increasing constraint, increasing rates of load and decreasing temperature are merely different methods of raising the yield point. The changes in temperature and rate from the observed load-deflection curves were measured, and it was found that, within the experimental error, by whatever means taken, the yield point at the transition from the ductile to the brittle failure reaches the same figure for any individual material. It has also been recognized that in the case of welded members, there are at least three different metallurgical materials: First, the properties of the base plate; second, the properties of the heat-affected zone adjacent to the weld; and third, the properties of the weld metal. A few tests, particularly on the unnotched 12" x 4" x 1" welded specimens showed failure close to the weld line, but micro examination has not yet been made. In the absence of defects, fracture seems to initiate in this region rather than in either the base plate or the weld material itself. Notch-bar experiments with the notch in different positions in the weld indicate that the weld metal does not reach its brittle condition until lower temperatures have been reached than in the case of the plate. Complete tests with the notch in the heat affected zone have not yet been made. The scope of this investigation did not embrace the all important question as to the embrittling effect of welds containing inherent defects. A very few tests were made in order to indicate the use of the drop-off point in studying size effect. The ½" thick metal broke at -250°F. and the 3/8" at -287°F. Much higher loading rates will be necessary to explore properly this variable, but evidently here again temperature may be used as a measure of constraint which is undoubtedly the responsible factor. The tabulated results for 170 load-deflection tests on 50 notched specimens in bending at different rates of speed are shown in table 1. Photographs, graphs and drawings of notched-bar load-deflection testing machine, internal wiring of oscillator, etc., are included, and the appendix contains additional data.

PB 22898. DIX, E. H., JR. and others. Fatigue and impact characteristics and notch effect in tension of artificially-aged aluminum alloys (NA-126). Progress report. (OSRD Rept 3579; War Metallurgy Committee Rept M-216) Apr 1944. 25 p. Price: Microfilm - 50¢ - Photostat - $2.00
Data from five laboratories on fatigue tests of plain and notched specimens and from two laboratories on impact tests of naturally-aged and artificially aged aluminum alloys are summarized in this report. In general it was found that the increase in yield strength and tensile strength accompanying artificial aging of aluminum alloys was not accompanied by appreciable increase in fatigue strength. Meager data indicated that the artificially-aged alloys tested had their fatigue strength reduced by a greater percentage by notches than did the naturally-aged alloys. Meager data for impact tests of notched specimens showed that the artificially-aged aluminum alloys tested evidenced lower resisting energy to impact than did the naturally-aged alloys. A few data on the effect of cold working on aluminum alloys are given and a note on the use of artificially-aged aluminum alloy for rivet material is included. The results of the study of this data are discussed. Tables and graphs are included.

PB 19513. DORN, JOHN E. Properties and heat treatment of magnesium alloys. Progress report, Nov 8, 1942 - Feb 10, 1943. (OSRD Rept 1291; War Metallurgy Committee Rept M-50) Mar 1943. 114 p. Price: Microfilm - $1.50 - Photostat - $8.00
Report of work carried on at the University of California is presented herein. The effect of specimen size on the properties of magnesium alloy sheet was evaluated by tensile tests on sheet of 0.020 to 0.500 inch thick and for specimens varying from 1/4 to 3 inches in width. Only minor variations in properties were observed. The small change in percent elongation was consistant with the rather uniform ductility over the gage length for the magnesium alloys tested. The notch sensitivity was determined by evaluating the ratio of the tensile strength of the unnotched specimen, (S_u), to the tensile strength, (S_n), of the specimen notched with a single central hole, (evaluated on the residual area). The notch sensitivity varied depending upon the conditions of preparing the hole. A modification of the Norton damping capacity machine was used to determine the specific damping capacity of tubular extrusions of SAE 52, 520, and a solid cast test bar of SAE 500. The effect of temperature and time of solution heat treatment on tensile bars of AMS 4434 was evalutated and the findings are given. Included in this report are plotted curves, tables of results of tests, photographs, drawings of equipment, and photomicrographs. See also PB 19511 and PB 19512.

PB 18886. DUWEZ, P. E. and others. The behavior of large plates under impact loading. (OSRD Rept 3292; NDRC Armor and Ordnance Rept A-254) Feb 1944. 32 p. Price: Microfilm-50¢ - Photostat-$3.00
Part I of this report presents the results of dynamic tests on hot-rolled, low-carbon steel plates ½ inch thick and 6 ft and 3 ft in diameter. These tests were made in order to extend previous work on the propagation of strain and to check the results of a theoretical study presented in a previous report. Circular plates supported at the edge were struck at the center at different impact velocities and for several durations of the impact. The machine with which these tests were made and the procedure are described. The deflection curves were determined at the end of impact and after the test was completed. In some tests the force acting on the punch during the impact was determined as a function of time. The results indicate that the point along the diameter at which the deflection is zero travels from the center of the plate toward the support proportionally to the square root of time. This relation is in agreement with the theory based on bending stresses only and is not in agreement with the membrane theory discussed in Part II of this report. The force acting on the punch increases with time, but less rapidly than dictated by the membrane theory. The bending theory requires that the force should be constant. These results indicate that a theory covering the dynamic deflection of a plate must include both tensile and bending stresses. Part II of this report discusses the performance of a plate on the basis of a theory in which the bending stresses are neglected and the tensile stresses are considered to be important. The results of this study indicate that if tensile stresses alone are considered the point along the diameter at which the deflection is zero travels from the center of the plate toward the support with a constant velocity and thus that the position of this point is proportional to time. The deflection curve is given for a typical base on this membrane theory. The force-deflection relations are developed and a typical case has been computed for comparison with the experimental results of Part I of this report. It is evident that the membrane theory alone is not adequate to explain the dynamic behavior of plates. Photographs, cross sectional drawing and curves are included. This work was carried out and reported by the California Institute of Technology under NDRC contract.

PB 18882. DUWEZ, P. E. and others. Factors influencing the propagation of plastic strain in long tension specimens. (OSRD Rept 1304; NDRC Armor and Ordnance Rept A-159) Mar 1943. 44 p. Price: Microfilm-50¢ - Photostat-$3.00
This report describes investigations of three factors that influence the propagation of plastic strain in long tension specimens. Part I is a study of the effects of lateral contraction, in which a series of copper wires of different diameters were tested statically and dynamically. The distribution of strain was measured and the values of uniform strain were compared with the theoretical values. Part II discusses the influence of cold-working on the propagation of plastic strain in copper. A discrepancy between experimental and theoretical curves is again found. Part III is a report of a preliminary study of the influence of the yield point on the propagation of plastic strain. Annealed iron wires were employed for these tests. The results indicate that the strain distribution in metals in which a definite yielding occurs is different from that in metals which do not have a definite yield point. Furthermore, it has been shown that the elastic limit is much higher under dynamic conditions than under static conditions, at least for impacts of short duration. Tables, photomicrographs and illustrative curves are included. This report provides some basic information on the propagation characteristics of metals which are important in studying the performance of armor plate, ship structures subjected to high explosive forces, aircraft landing gear, etc.

PB 18881. DUWEZ, P. E. and others. The influence of impact velocity on the tensile properties of plain carbon steels and of a cast-steel armor plate. (OSRD Rept 1274; NDRC Armor and Ordnance Rept A-154) Mar 1943. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
Part I of this report describes experiments made on a series of plain carbon steels for the purpose of determining the influence of a yield point on the correlation between theoretical and experimental values of critical velocity. The results of the work show (1) that the von Kármán theory as it now stands cannot be applied to materials which have a distinct yield point; (2) that the ultimate strength of plain carbon steels is greater under impact conditions than under static conditions; and (3) that the energy required for rupture of cold-rolled steels increases with impact velocity up to the critical value, while there may be little or no increase in the case of plain carbon annealed steels. Part II describes an investigation of the effect of impact velocity on the tensile characteristics of a cast Mo-Man-Sil armor plate. Specimens of this material were tested statically and dynamically at impact velocities up to 100 ft./sec. The plate material was found to be porous. The results indicate that this particular casting has inferior dynamic properties and that inhomogeneities such as porosity alter the strain propagation from what would be expected in a hot-worked steel. Photomicrographs of various steels, tables and illustrative curves are included.

PB 19814. FAUST, CHARLES L. and LUKENS, HIRAM S. Silver plating of steel flatware. Advisory report, Oct 23, 1942 - Jan 23, 1943. (OSRD Rept 1240; War Metallurgy Committee Rept M-51) Mar 1943. 28 p. Price: Microfilm - 50¢ - Photostat - $2.00

This report traces the history of efforts to use silver plate directly on carbon steel in substitution for non-rusting alloys, for silver plate on nonferrous alloys, and for copper + nickel + chromium plate on steel in the fabrication of tableware for the armed forces, thereby releasing strategic stainless alloys and nonferrous metals for other essential uses. Initially purchased ware showed extensive peeling of the silver plate and profuse rusting of the pieces that had adherent silver plate. Because of these failures, the material was declared to be unacceptable to the Army and the Navy. This situation prompted the creation of a committee charged with the duty of finding the causes of and, if possible, ways for eliminating poor adherence and rusting of the silver-plated steel flatware. The activities and findings of this committee, during the period of October 23, 1942, to January 23, 1943, are recorded herein. It is recommended that the investigation of heat treating silver-plated ware should be continued at the University of Pennsylvania in order to evaluate further the effects on decreasing porosity and improving rust resistance of the ware. It is also recommended that other investigations be continued.

PB 20223. GRIFFIS, LE VAN and MORIKAWA, GEORGE K. Behavior of steel under conditions of multiaxial stress and the effect on this behavior of metallographic structure and chemical composition (NS-307): Progress report, Jan 15, 1944 to Oct 15, 1944. (OSRD Rept 4793; War Metallurgy Committee Rept M-444). Feb 1945. 51 p. Price: Microfilm-$1.00 - Photostat-$4.00

A series of static flow and fracture tests was conducted at room temperature on a semi-killed medium ship steel, under several conditions of multiaxial strain, at the Illinois Institute of Technology. These conditions were produced by different combinations of internal pressure and axial tension on hollow cylindrical specimens. Tests on eleven unwelded specimens are discussed, of which specimens six were machined from as-rolled material and five from annealed material. Each specimen was tested with the ratio of principal biaxial stresses held essentially constant on the outer surface of the specimen and all were tested at room temperature. Complete stress-strain data are recorded for each specimen and the results are analyzed in terms of current theories of plastic flow. Comparison of the strength and ductility of this material in the as-rolled and annealed conditions, shear and cleavage types of fractures, and the effect of anisotropy on the behavior of the material are discussed. Photographs and drawings of equipment and specimens, stress-strain curves, tabulated data, and a bibliography are included. For final report see PB 20201.

PB 4437. HARDER, OSCAR E. and VOLDRICH, C. B. Report on weld bead hardness tests on W.D. steels. Jan 1943. 75 p. Price: Microfilm - $1.00 - Photostat - $5.00

Weld bead hardness tests on thirty-four W.D. steels were made at Battelle Memorial Institute and the results are presented in this report. Data sheets are included in Appendix I for each steel tested giving the Vickers hardness in the heat affected parent plate and in the unaffected plate at initial plate temperatures of 65°, 300°, and -200°F., the deoxidation practice, grain size, Brinell hardness, and other data. Table 3 gives a summary of steel types, compositions, grain sizes, and the weld-bead hardness tests. The experimental procedures used in making the weld bead hardness tests are given in "American Welding Society Tentative Tests for Arc-Welding Properties of steel: A. "Weld-bead Hardness Test" which is reproduced as Appendix II of this report. Photographs of apparatus, diagrams of specimens and graphs are included.

PB 19827. HESS, W. F. and others. Spot-welding of magnesium alloys: Part II - Spot welding characteristics of chemically cleaned magnesium alloy sheet. Final report, Aug 1944. (OSRD Rept 4956; War Metallurgy Committee Rept M-375) Apr 1945. 122 p. Price: Microfilm-$1.50 - Photostat-$9.00

Data on the welding characteristics and on the effect of spot-welding on the stress corrosion susceptibility of magnesium alloys containing aluminum and zinc are presented in this report prepared at the Rensselaer Polytechnic Institute. The subject matter includes: (1) The description of methods for testing and examining spotwelds in magnesium alloy sheet; (2) the determination of optimum conditions for spotwelding two equal thicknesses of each of the commercially available compositions of magnesium alloy sheet in selected tempers and gauges after chemical surface preparation, and the physical properties of spotwelds in each of the material for which optimum welding conditions were established; (3) a study of certain factors which affect electrode tip fouling and tip life when spotwelding magnesium alloy sheet; and (4) the general corrosion and stress corrosion characteristics of spotwelded magnesium alloy sheet. The report includes tabulated data, a bibliography, plotted curves showing strength-current characteristics of various chemically cleaned alloys, stress corrosion curves, and dynamic resistance curves. For Part I see PB 19828.

PB 4427. HOLLOMON, JOHN H. Tensile and impact properties of an alloy steel. (Watertown Arsenal Lab Rept 310/34) Sep 1944. 17 p. Price: Microfilm-50¢ - Photostat-$2.00

The complete stress-strain curves obtained for this steel have the same characteristics as were found in previous studies. The relation between stress and strain is essentially linear from the strain at which necking begins to the strain at fracture. The logarithm of the stress is a linear function of the logarithm of the strain at least in the range of strain from .01 to .4. The slope of the logarithmic stress-strain curve of this steel decreases with increasing yield strength. The relation between the slope and yield strength is presented graphically in this report and may be used to obtain approximate stress-strain curves useful for design calculation of guns, etc. The impact test indicates general agreement with previous experience with steels having tempered martensitic structure. The high level of the impact energy is maintained to fairly low testing temperatures. Even at very low temperatures (-300° F.), a completely brittle fracture did not occur with specimens even of the highest yield strength. At this lowest temperature of test, the impact energy of specimens at all yield-strength levels was low (5 to 10 ft.-lbs.). Previous experience indicates that steels not having a completely tempered martensitic structure will reach even lower values at much higher temperatures. A gradual transition in impact energy with decreasing temperature also seems to be characteristic of the properties of this steel having this structure. The temperature of transition for this steel appears to increase with increasing yield strength.

PB 19519. JACKSON, L. R. and others. Fatigue properties of magnesium alloys and structures: Fatigue properties of magnesium alloy sheet - Part III (MA-145). Final report, Aug 31, 1944. (OSRD Rept 4282; War Metallurgy Committee Rept M-381) Oct 1944. 59 p. Price: Microfilm - $1.00 - Photostat - $4.00

An extension of fatigue data on J-1 alloy sheet to negative ratios of minimum to maximum stress indicated that values for the negative ratios fall on smooth curves obtained from positive ratios. A continued study of the notch sensitivity of J-1 alloy sheet indicated that measured stress concentration factors depends on the mean load and is lower for high mean loads. Tests to determine the effect of precipitation heat treatments to combat static stress corrosion on fatigue strength and on the corrosion fatigue strength of J-1 alloy, and the fatigue strength of cycle-welded joints are discussed in this report prepared at Battelle Memorial Institute. Photomicrographs, tabulated results, fatigue curves, fatigue corrosion curves, and photographs of test specimens are included. See also PB 19517-19518, and PB 19520-19522.

PB 20211. JACKSON, L. R. and others. Investigation of boron in armor plate (OD-87): Endurance properties of basic open hearth steel containing 0.4 per cent carbon and 1.6 per cent manganese without and with boron addition. Progress report, Aug 15, 1944. (OSRD Rept 4235; War Metallurgy Committee Rept M-387) Oct 1944. 30 p. Price: Microfilm-50¢ - Photostat-$2.00

Two steels from Special Addition Agent Heat (No. 126405) (Army Research and Development No. R.A.D. 1448), one of SAE 1345 base composition, Ingot No. 15, the other treated with 4 pounds of Grainal No. 79 per ton, Ingot No. 10, and a reference steel of SAE 4145 grade were tested for endurance properties at Battelle Memorial Institute. The heat treatment consisted of quenching in still oil and immediately tempering to one of several tempering temperatures. With the exception of steel from Ingot No. 15, tempered to 450° F., the endurance properties of the three steels tempered to the same hardness values were comparable. All steels showed the same sensitivity to notches, and, with the one exception mentioned, when tempered to the same hardness each steel showed the same relation between endurance limit and tensile strength. Other conclusions, and discussion of the experimental work and results are presented. Tables showing the chemical properties of the steels used, and their hardness, tensile and endurance properties; and stress curves are included in this report. See also PB 20210 and PB 20212-20213.

PB 4430. JAFFE, L. D. and SWARTZ, B. Time-temperature relations in tempering steel. (Watertown Arsenal Lab Rept 310/21) Sep 1944. 78 p. Price: Microfilm-$1.00 - Photostat-$6.00

Six heats of plain carbon steel, five of which differed only in carbon content (ranging from .31% to 1.15%), were fully quenched to martensite and tempered for times ranging from 10 seconds to 24 hours at temperatures of 100° to 700° C. It was found that the hardness obtained were functions of the parameter $T(\log t/t_0)$, equivalent to $T(c+\log t)$, where T is the absolute temperature, t the time and t_0 and c the constants of the steel. This functional relationship was found to hold very closely for all appropriate tempering data noted in metallurgical literature, except when graphitization took place. These results permit close estimation of the hardness that will be obtained with any time and temperature of tempering, with much less experimental data than was formerly necessary.

PB 19832, PB 19826. MCMASTER, R. C. and others. Radiographic and fluoroscopic methods of inspection of spot welds in aluminum alloys, Parts I and II. Final report, Jan - Sep, 1944. (OSRD Rept 3827 and 4620; War Metallurgy Committee Rept M-168 and M-380) Jun 1944; Jan 1945. PB 19832, 195 p. Price: Microfilm - $2.00 - Photostat - $13.00; PB 19826, 178 p. Price: Microfilm - $2.00 - Photostat - $12.00

Part I (PB 19832) presents the results of an investigation of radiographic and fluoroscopic methods of inspection of spot welds in 24 ST Alclad aluminum alloy sheets of equal thickness. Part II (PB 19826) presents the results of investigations of alloys other than 24 ST Alclad, of dissimilar sheet thickness combinations, of spot weld fatigue properties and of radiographic and fluoroscopic techniques. The work was carried out at the California Institute of Technology under the sponsorship of the War Metallurgy Committee, National Defense Research Committee. It was concluded that the static shear strength of spot welds in equal and dissimilar thickness combinations (up to ratios of at least 3:1) of 24 ST Alclad, 24 ST bare, and KB 75 ST Alclad aluminum alloys throughout the range of sheet thicknesses from 0.016" to 0.125" can be determined consistently and reliably from spot weld radiographs. It was also concluded that the fatigue strength and life of spot welds in 24 ST Alclad and KB75 ST Alclad aluminum alloys can be determined from spot weld radiographs insofar as the fatigue strength depends upon weld nugget size, extent of Alclad inclusion into the weld nugget at the faying plane, and extent of cracking. It was further concluded that measurements of fluoroscopic screen contrast and definition show that these properties are inadequate for spot weld inspection with any commercial or experimental fluoroscopic screen now available for testing. Appendices contain additional test data. Tables, graphs, photographs and radiographs are included.

PB 22669. MOREY, ROBERT E. and KATTUS, J. ROBERT. The prevention of veining and penetration of castings made in synthetically bonded sands. n. d. 35 p. Price: Microfilm-50¢ - Photostat-$3.00

Veins and penetration are surface defects which frequently occur on castings produced in synthetically bonded sand. They are frequently found on lead and tin bronze castings and occasionally on iron and steel castings. In order to find methods for preventing their formation an investigation was made to determine the mechanism of veining and penetration. Phosphor bronze was used in experimental work because the defects are most prevalent in castings made with this alloy. Veining of bronze castings is caused by (1) sweating of the metal, which is an extreme case of inverse segregation, and (2) cracking of the mold or core. In the late stages of solidification dissolved gases come out of solution and force the low melting point constituent of the alloy towards the surface of the casting through interdendritic passage-ways. Frequently this constituent exudes from the surface of the casting and enters cracks in the mold or core to form veins. Cracking of molds and cores is believed to be caused by the thermal expansion characteristic of silica. Penetration defects occur when the exuded metal enters interstices among the sand grains. The elimination of most veining on bronze castings can be accomplished by proper melting practice because this tends to reduce the amount of dissolved gases in the molten metal. Sand technique which help to eliminate veining by preventing the mold from cracking were developed. Washes containing finely divided refractories stop penetration by filling interstices in the surfaces of molds and cores. The mechanism of veining on gray iron castings is believed to be similar to that of veining on bronze castings, but it is believed that veins on steel castings form only at location where hot tears occur. A synthetic molding and core sand were developed at the Naval Research Laboratory; specifications for both are given in this report. The report covers the following subjects: Observations regarding veining and penetration, suggested mechanism of veining, experimental procedure, test results, prevention of veining by proper melting, influence of the sand mixture on veining, ramming, grain fineness and distribution, facing material, washes with low fusion points, clay content of molding sand, and core sand. Conclusions are given and the report includes a bibliography, photographs, diagram, graph and tables.

PB 22896. NORTON, JOHN T. and others. Effect of locked up stresses on ballistic performance of welded armor-Part I. (OD-106). Final report. Feb 1, 1944. (OSRD Rept 3580; War Metallurgy Committee Rept M-244) Apr 1944. 106 p. Price: Microfilm - $1.50 - Photostat - $8.00

An investigation was undertaken at the Massachusetts Institute of Technology to determine the influence of locked up or residual stresses on the ballistic performance of welded armor as demonstrated by the explosion test. Part A of this report covers some orienting experiments on prime plate, which while unsuccessful in showing the influence of residual stresses, were of considerable value in demonstrating the unexpected nature of failure in the explosion test. Part B covers the results on welded plate in which a comparison was made between specimens containing varying amounts of residual stresses due to welding and others in which the stresses had been removed by heat treatment. One austenitic and one ferritic electrode were used. In the explosion test, the austenitic welds gave the best results, the as welded ferritic welds were next, and the stress relieved welds were the worst. Taking into account the nature of the failure in the explosion test, it was concluded that the residual stresses set up by welding of simple butt joints in unrestrained specimens had little influence on the ballistic performance. The experiments are described and results discussed. Tabulated data, photographs of equipment and specimens tested, diagrams, and graphs are included. See also PB 22895 and PB 22897.

PB 22897. NORTON, JOHN T. and others. Effect of locked up stresses on ballistic performance of welded armor - Part II (OD-106). Final report, Nov 24, 1944. (OSRD Rept 4396; War Metallurgy Committee Rept M-421) Nov 1944. 61 p. Price: Microfilm - $1.00 - Photostat - $5.00

Specimens of welded armor about 12 inches square by 1 inch thick were prepared using three types of electrode. They were subjected to a high velocity explosion test in order to observe the effects of the residual stress system produced by welding, heat treatment after welding, and the nature of

the weld itself on the ballistic performance. The residual stress patterns observed for the three types of electrode were very similar. The patterns were nearly biaxial in character but showed marked variations at different levels below the surface, the peaks being of considerable magnitude. There was no evidence that the dissimilar nature of the austenitic weld produced any significant change in the stress situation. It was concluded that the residual stress pattern had but a minor influence on the resistance of the welds and that the major factor is the metallurgical nature of the welded joint. The additional conclusion was made that heat treatment after welding is likely to do more harm than good. The experimental procedures are outlined and the results discussed. The appendix contains data on the computation of various stresses. Tables of data, plotted curves, photographs, and diagrams are included in this report of work carried on at the Massachusetts Institute of Technology. See also PB 22895-22896.

PB 22672. REICHELDERFER, CHARLES A. and others. Utilization of tin from Texas tin smelter: Part II-Use of Texas tin in bronzes. Final report, May 15, 1943 - Dec 1, 1943. (War Metallurgy Committee Res Rept W-80) Jan 1944. 39 p. Price: Microfilm-50¢ - Photostat-$3.00
To determine the effect of the antimony content of the lower grades of tin from the Texas Tin Smelter on the physical properties of bronze alloys, a number of heats of 88Cu - 10Sn-2Zn, 88Cu - 8Sn -4Zn, and 80Cu - 10Sn - 10Pb were compounded from electrolytic or Lake copper, 99.99 percent zinc, Chempur tin, Texas One-Star and Two-Star tin, and antimony. Later, selected secondary alloys of suitable compositions were used as a base to which the lower grades of Texas tin were added to give the required final composition. In the experimental work conducted at Battelle Memorial Institute and presented in this report, it was found that the small amount of antimony contained in the least pure Texas tin (1.12 percent) had no deleterious effect on the properties of the three alloys under the conditions of these tests. Averages of mechanical properties were well above A.S.T.M. and government specifications in all cases. Other results of tests are given. It was concluded that Texas tin (made largely from low grade Bolivian concentrates) containing less than 1.5 percent antimony can be used in compounding bronze alloys without harmful influence on physical properties. Tabulated test data, plotted curves and photomicrographs are included.

PB 19520. RUSSELL, H. W. Fatigue properties of magnesium alloys and structures: Fatigue properties of magnesium alloy sheet. Progress report, Mar 7, 1943. (OSRD Rept 1457; War Metallurgy Committee Rept M-76) May 1943. 78 p. Price: Microfilm - $1.00 - Photostat - $6.00
This quarterly progress report of work carried on at Battelle Memorial Institute describes test methods and results of fatigue tests on monoblock samples of J-1h, J-1a, Mh, and Ma magnesium alloys (Dowmetal), tests to determine the effect of width, thickness, and orientation on the fatigue strength of magnesium alloys, and fatigue tests of lap joint specimens of J-1h, including tests on riveted joints, on spot-welded lap joints, and on cycle-welded joints. The report includes tabulated results, photomicrographs, stress-strain curves, curves showing fatigue strength, and photographs and drawings of equipment and specimens. See also PB 19517-19519 and PB 19521-19522.

PB 19521. RUSSELL, H. W. Fatigue properties of magnesium alloys and structures: Fatigue properties of magnesium alloy sheet. Progress report, Jun 7, 1943 (OSRD Rept 1858; War Metallurgy Committee Rept M-125) Sep 1943. 78 p. Price: Microfilm - $1.00 - Photostat - $6.00
Part I of this report of work at Battelle Memorial Institute discusses the results of fatigue tests on the following samples of magnesium alloys: Monoblock samples, samples with rivet holes, riveted lapjoint samples, spotwelded lap joint samples, heliarc-welded samples, and cyclewelded lap joints. Fatigue tests results are presented in the form of load-life curves. Part II gives information on the physical properties of these materials and the results of metallographic examination of the test samples. Included also are photographs of samples, tabulated data, diagrams showing Vickers hardness across spotwelds and heliarc welds in wrought magnesium, and a short bibliography. See also PB 19517-19520 and PB 19522.

PB 22159. SHAW, FRED B. JR. Condition of two-compartment containers in storage at Chemical Warfare depots. (CWS Tech Div Memo Rept 543) Jan 1943. 15 p. Price: Microfilm - 50¢ - Photostat - $2.00
The object of this investigation was to determine the condition of filled two compartment, six-gallon containers in the field, and to determine what components of the two-compartment container are particularly in need of further development. It was concluded that subject containers procured under C.W.S. Specification No. 197-54-202 prior to the October 12, 1942 revision, may be considered to be entirely satisfactory up to six months after filling. Those filled in excess of six months are subject to many failures due to corrosion. The corrosion failure has been due to the lack of adhesion of the protective enamel to the base metal enamels used on inner compartments has sufficient resistance to HH-195 to resist corrosion for periods considerably in excess of one year, provided adhesion can be maintained. The outer compartment is apparently not subject to failure due to corrosion. Either the forming die for the bottom panel or the crating of the filled containers is unsatisfactory. Rubber, especially reclaimed rubber, is unsatisfactory for use in fabricating the separate gasket. The acetylene tetrachloride and HH-195 in containers which have failed badly due to corrosion may still be in satisfactory condition if they have not become mixed. Reclamation of HH-195 and acetylene tetrachloride from corroded containers is feasible and advisable. Photographs and table are included.

PB 19824. STOUT, R. D. and others. Methods of testing weldability of steel plates and shapes: Part II. Final report, Sep 1944. (OSRD Rept 4529; War Metallurgy Committee Rept M-398) Jan 1945. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
Comparisons between different brands of the same class of electrode and between various plate compositions, using testing methods described in the Part I of this report (PB 19830) are presented herein. A summary of the results is as follows: (1) Definite differences were revealed among the eleven brands of E6010 electrode tested; (2) when E6010 was substituted for E6020, the ratings of plate compositions kept the same relative positions. As a whole, the cracking levels were improved by the change to E6010, in agreement with the previous results; (3) investigations of weld contours showed that the improved resistance to cracking of the welds made with E6010 electrode is probably due to the convex surface and greater weld thickness produced with this electrode under the usual welding conditions; (4) the survey of preheat temperatures indicated that cracking sensitivity is reduced proportionately as the plate temperature is raised; and (5) the use of alternating current for welding instead of direct current produced no significant change on the cracking level. Brief description of the tests, charts, tabulated data, and plotted curves are included in this report which was prepared at Lehigh University.

PB 19511. THOMSEN, E. A., and others. Properties and heat treatment of magnesium alloys (Ma-144). Progress report: Aug 5, 1943. (OSRD Rept 1950; War Metallurgy Committee Rept M-129) Oct 1943. 49 p. Price: Microfilm-50¢ - Photostat-$4.00
This report of work conducted at University of California is presented in two parts: Part I, notch sensitivity of magnesium alloy sheet; and Part II, effect of microstructure on notch sensitivity of magnesium alloys in static tension. The sensitivity of alloys VII (FS and AM0525) and alloys VIII (FS - 1h and AM0525-H) to centrally drilled and reamed hole has been determined. The notch sensitivity for constant width of alloy VIII is practically invariant with the form factor $\frac{d}{w}$, and increases with increasing width for constant form factor for the alloys VII and VIII. In Part II investigations of the notch sensitivity of magnesium alloy extrusions are described. Preliminary data indicated that

certain specified alloy extrusions in the "as received" condition display little notch sensitivity under a 60°V notch, in the bar design studies, under conditions of axial tensile stress. Preliminary investigations of the heat treatment of certain alloy extrusions are described. Microstructural tensile strength, and hardness data are given in the form of photomicrographs, plotted curves and tables. See also PB 19512 and PB 19513.

PB 4434. WEST, W. Principles of phase transformations. Second partial report. (Watertown Arsenal Lab Rept 310/37-1) Jan 1945. 36 p. Price: Microfilm-50¢ - Photostat-$2.00
Major factors in the heat treatment of a specimen of steel are the transformations which the material undergoes on heating and cooling, the temperatures at which these transformations take place, and the speed at which they take place. The equations developed by Zener (Watertown Arsenal Laboratory Report 310/37, PB 4435) are intended to permit calculation of the effects of one or more alloying elements on the first two of the above factors. If the validity of these equations can be established, and if the characteristic constants can be determined for the various alloying elements, it should be possible to predict the heat-treating properties of steel of a given composition, or to make up a steel of composition such that it would have specified heat-treating properties of steel of a given composition, or to make up a steel of composition such that it would have specified heat-treating properties, at least so far as the first two factors mentioned above are concerned. It is obvious that this would be an important aid to practical steel making. In order to test Zener's equations the literature has been searched for pertinent experimental data on iron alloys containing carbon. Only actual results have been used, and not values from smoothed curves, except in the case of molybdenum, where only curves were available. A number of cases have been found in which the data confirm the theory within the limits of experimental error, and in which reliable constants for the equations can be determined. In other cases the data available are few, or discordant, and no conclusion can be reached either way. Only two cases have been found of clear-cut disagreement of experiment with theory. However, in view of experimental difficulties in work of this sort, the amount of agreement obtained gives confidence in the rather general applicability of the theory. Graphs, tables, bibliography and calculations.

PB 19793. WHITE, A. E. and SIEBERT, C. A. Report on literature survey on the low-temperature properties of metals, to October 1941, (in 7 vols.) (OSRD Rept 281) Dec 1941. 591 p. Price: Microfilm-$6.00 - Photostat-$40.00
This report on the available information on the low temperature properties of metals was made at the request of the National Defense Research Committee. The data are grouped into two major divisions of ferrous and nonferrous alloys, and each major group is divided into sub-groups according to alloy types. The ferrous alloys are listed having one, two and three alloying elements. Tests show that the nonferrous metals maintain their room temperature physical properties or show an improvement over the room temperature properties at sub-zero temperatures. The ferrous metals show an increase in hardness. Tensile strength and yield point at the lower temperatures. Increased brittleness and other defects appear, however. The report also discusses the transition temperature from a tough to a brittle type of fracture. The factors which affect the transition temperature are (1) the grain size of the material (2) carbide size and distribution, (3) inclusion of nonmetals and dissolved gases, (4) type of notch used in test, (5) type of impact testing machine and (6) presence of nickel. The most outstanding element which aids in maintaining good impact resistance is nickel. Copper is good, but not as good as nickel. In general, it appears that any element which is a solid solution forming type with ferrite tends to improve the low temperature resistance, while any carbide forming element, when in the presence of substantial amounts of carbon, tends to decrease the low temperature impact resistance. Three more or less standard impact-testing machines were employed, the Charpy bar using a V and keyhole notches and the Izod bar using a V notch. Tables and bibliography. This work was assembled at the University of Michigan.

PB 19834. WILLIAMS, R. S. Metallurgical studies and surveys of Army Quartermaster Corps supplies: Part I-Problems under investigation for the Office of the Quartermaster General for the period Feb 1, 1943 to Aug 1, 1943; Part II-Camouflage of mess gear (QMC-25). Final report. (OSRD Rept 2065; War Metallurgy Committee Rept M-166) Nov 1943. 15 p. Price: Microfilm - 50¢ - Photostat-$1.00
Experimental work and consultations on mountain and ice equipment, canteens, cook pots and miscellaneous items are described in Part I. Much of the experimental work was done at the Massachusetts Institute of Technology. The work on ski binders and pitons is reported at length. Drawings of rock and ice pitons are included. Canteens had always been made of drawn aluminum and had given excellent service. With the demand for aluminum due to the greatly enlarged airplane program, it became necessary to provide other materials for the production of the major part of the supply needed. Many types of plastic or rubber-like canteens have been made. Plastic covered steel and enamelled steel have been tried. The metal previously used for cook pots also had been aluminum. Tinned steel was suggested but the amount of tin could not be allocated. Vitreous enamelled made from stainless clad, low carbon steel. Miscellaneous items described in the report are: Small tools, shoe eyelets, hooks and plates, toe plate, heel plate, and pails and refuse cans. The camouflage of mess gear is discussed in Part II. Samples of stainless steel canteens were studied for the purpose of decreasing their reflectivity. A metal spray process was found to be effective in this respect, but the other characteristics were being determined by the National Bureau of Standards.

PB 4435. ZENER, C. Principles of phase transformations. First partial report. (Watertown Arsenal Lab Rept 310/37) Sep 1944. 82 p. Price: Microfilm-$1.00 - Photostat-$6.00
The general theory of the equilibrium between two solid phases is developed from general thermodynamical and statistical mechanical concepts. The general theory is applied to the equilibrium relations in the iron-carbon system between the alpha, gamma and carbide phases, and to the effects of alloying elements thereon. Not only is it possible to bring all observed equilibrium data into a consistent picture, but a method has been developed for rapidly computing the equilibrium relations in any medium alloy steel. The influence of alloys upon the boundary of the gamma phase in equilibrium with the alpha phase may best be visualized in terms of a master boundary curve. In the pure iron carbon system the lower branch of this curve forms the boundary in equilibrium with the alpha phase, the upper branch the boundary in equilibrium with the delta phase. Alloys simply shift this master curve horizontally. Certain elements, such as Ti, Sn, P, V, W, Mo, Al, Si, shift the curve to the right, thereby raising the temperature for the alpha-gamma transformation, lowering the temperature for the delta-gamma transformation. Other elements, such as Cu, Zn, Mn, Ni, N, shift the master curve to the left, thereby lowering the temperature of the alpha-gamma transformation, raising the temperature of the delta-gamma transformation. The shift associated with each element is proportional to its concentration, and is independent of the concentrations of the other elements. The influence of alloying elements upon the boundary of the gamma phase in equilibrium with the carbide phase may best be visualized in terms of a dividing function. The carbon concentration at this boundary is equal to the concentration for the pure iron-carbon system divided by this function, which is different for each temperature. The cube root of this dividing function is a linear function of the concentration of the alloying elements. This problem of the right hand boundary of the gamma phase is solved through use of the concept of the complex carbide (Fe, Alloy)$_3$ C. Graphs, tables, and calculations.

PB 4433. ZENER, C. Principles of phase transformations. Third partial report. (Watertown Arsenal Lab Rept 310/37-2) Jan 1945. 79 p. Price: Microfilm-$1.00 - Photostat-$6.00

The equilibrium relations in steels, the subject of the first and second partial reports of this series, (WAL 310/37 and WAL 310/37-1, PB 4435 and 4434, respectively) must form the basis for a scientific approach to the problem of the heat treatment of steel. From the equilibrium relations alone, however, practically nothing can be surmised regarding the mechanical properties of the steel. These properties depend primarily upon the mode of distribution of the two principal phases, ferrite and carbide. Even alloying elements affect the mechanical properties of steel largely through their influence upon the distribution of the ferrite and cementite. The initial stage in the heat treatment of steel is austenization. In this process the steel is heated to such a high temperature that (1) all the constituents become uniformly distributed, (2) the lattice structure is of the face-centered cubic type. The second stage is the cooling of the steel. The steel may then be used as is, or may be subjected to further heat treatment. In any case, the mechanical properties of the end product are largely conditioned by the mode of distribution of the cementite after the steel has been cooled from the austenitizing temperature. It is with the principles which determine this distribution in the as quenched steel before tempering that the present report, the third of this series, is concerned. Although the reactions which occur on cooling are essentially irreversible, none the less equilibrium relations play a fundamental role therein. The irreversibility resides primarily in the diffusion phenomena. The actual advance of a phase boundary is found to occur under essentially reversible conditions, the concentrations of the constituents being in equilibrium on the two sides of the boundary. Since diffusion obeys well known laws, the irreversible phenomena which accompany the cooling of steel from the austenitizing temperature are therefore susceptible to exact mathematical treatment. Graphs, photographs, tables and appendix of calculations.

PB 4431. ZENER, C. Principles of phase transformations. Fourth partial report. (Watertown Arsenal Lab Rept 310/37-3) May 1945. 16 p. Price: Microfilm-50¢ - Photostat-$2.00

Two conflicting theories have been proposed in the literature to explain the mechanism whereby martensite loses its tetragonality. According to one theory the loss of tetragonality is due to the diffusion out of certain preferred interstitial positions to neighboring interstitial positions. The initial cubic ferrite has the same carbon concentration as the parent tetragonal martensite. According to the second theory, the loss in tetragonality is due to the gradual reduction in amount of carbon in solid solution through some sort of precipitation. In this report the two mechanisms are critically examined. It is found that both mechanisms are operative. The tetragonality initially decreases, because of some sort of precipitation, until the carbon content in solid solution has been reduced to about 0.2 weight per cent. Thereafter the lattice changes to a cubic structure with the same carbon content (0.2%) as the prior slightly tetragonal martensite. In this examination it was necessary to determine the stability of tetragonal vs. cubic lattice with supersaturated carbon. It was found that a critical temperature exists below which the stable structure is tetragonal, above which the cubic structure is stable. When the carbon content is 0.2 weight percent, this critical temperature is about 0° C. Graphs and calculations.

PB 19829. ZICKRICK, LYALL and others. Bi-metallic copper-steel driving bands for projectiles: (MO-159). Part I-Experimental driving bands for the naval 40 mm projectile; PartII-Centrifugal casting of duplex copper-steel tubing for driving bands. Final report. (OSRD Rept 3885; War Metallurgy Committee Rept M-297) Jul 1944. 43 p. Price: Microfilm - 50¢ - Photostat - $3.00

This project called for a laboratory investigation of the metallurgical factors involved in the development of bimetal copper-steel driving bands, and a method for producing a bond between steel tubing and copper tubing by alloying the two together. The work was carried out at the Research Laboratories of the General Electric Company and at the U.S. Pipe and Foundry Company. It has been found that satisfactory bands for shells can be made by alloying composite steel-copper tubing by means of a zinc interlayer, which is introduced by zinc coating the steel tubing, telescoping the coated tube inside a copper tube, drawing the composite assembly through a die to make an air tight joint, then firing to produce an alloy bond. Other alloying materials were considered. None are to be recommended in preference to zinc. Photographs are included.

METEOROLOGY AND CLIMATOLOGY

PB 22485. FINDEISEN W. The evaporation of cloud and rain droplets. (United Kingdom. Ministry of Aircraft Production. RTP Translation 2571) n. d. 12 p. Price: Microfilm-50¢ - Photostat-$1.00

Formulas are derived for the rate of evaporation of cloud and rain droplets, and in addition the evaporation times and drop tracks are determined. The results are illustrated by means of numerical examples, and their meteorological significance is discussed. In the micro-physical investigation of clouds, the question often arises as to how quickly the evaporation of the cloud and rain droplets can be effected of itself, insofar as the preliminary condition for evaporation, namely a difference in water vapor pressure between the surface of the droplets and the surrounding air, is fulfilled. This is the question considered in this report which is divided into the following sections: I. Basic formula for cloud droplets; II. Basic formula for rain drops; III. Evaporation time; IV. Evaporation fall track; V. Evaporation of the droplets in clouds. This report is a translation from the German and a list of references to German publications is included.

PB 18748. GERMANY. REICHSFORSCHUNGSRAT. Halbjahresbericht über die untersuchungen über gesetzmässigkeiten bei luftdruckschwankungen in grossen gebieten (Semi annual report on investigation of laws governing atmospheric pressure changes in large areas) (ALSOS Mission, Gerlach 3) Oct 1944. 5 p. Price: Microfilm - 50¢ - Photostat - $1.00

Meteorological data of the German naval observatory covering the period from Aug 1 to Nov 8, 1932 and referring to the territory of Germany from 40° to 65° latitude and the 20th and 50th meridians were tabulated and studied with the idea of finding laws governing the changes of atmospheric pressure of the area. Laws have been found making it possible to predict such changes for months in advance and to check any weather prognostications for reliability. Tables and graphs mentioned in text are missing. In German.

PB 10313. U. S. ARMY AIR FORCES. WEATHER DIVISION. Studies on local forecasting, Maxwell Field, Montgomery, Alabama. (Report 600-170) Dec 1944. 17 p. Price: Microfilm-50¢ - Photostat-$2.00

Maps illustrate typical synoptic situations. No topographic map nor orographic effects diagram are contained in this report, but tables present meteorological data.

PB 22078. U. S. WAR DEPARTMENT. Mobile meteorological station SCM-1. (Tech Manual 11-2409) Mar 1945. 51 p. Price: Microfilm-$1.00 - Photostat-$4.00

This manual covers the over-all installation and operation of the mobile meteorological station but does not include instructions for the operation of the individual components. Mobile Meteorological Station SCM-1 may be used as a Class A, C, or D weather station; it includes equipment for making observations and obtaining meteorological data on direction and speed of surface winds and winds aloft; barometric pressure; air temperature; relative humidity; amount of precipitation; and ceiling heights. The station also includes communication facilities, map display equipment, and necessary supplies for preparing weather forecasts. A technical manual for each of the major components is packed with each unit. This manual includes description including table of components, and instructions for installation, assembly, operation and repair. Lists of references and maintenance parts are given. Appendix contains supplementary data on dimensions and contents of cabinets, storage chest, map plotting table and map plotting board case. Photographs, drawings and a layout diagram are included.

ORDNANCE AND ACCESSORIES

British

PB 23151. FONDER, SPEERS G. British MKIII and MKIIIE bombs, incendiary 4-lb. magnesium. (CWS Tech Div Memo Rept 385). Oct 1941 - Apr 1942. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
The British bombs were compared with Incendiary Bombs AN-M50A1 and AN-M54. The differences in sensitivity, water resistance, ignition time, violence of explosion, safe dropping height and other factors were noted. A table also shows the results of the comparative static burning tests. Photographs of the incendiary effects of the bombs are presented.

German

PB 22638. BRITISH INTELLIGENCE OBJECTIVES SUB-COMMITTEE. High/low pressure chamber. (Halstead Exploiting Centre Rept 376) n. d. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
The density of loading determines the size of the high pressure chamber; empirical values also determine the ratio of (1) high to the low pressure chamber volumes and (2) the gas pressure in the high pressure chamber to that in the low pressure chamber. The ratio is about 1.3 and 3.1 respectively. These most favorable values cannot always be maintained when designing the gun as they very often do not comply with other conditions. Deviating from these conditions results in deterioration of the constant pressure diagram. After fixing the volumes of the high and low pressure chambers, a trial firing determines number and size of the nozzles, charge weight and kind of propellant. The principle of the nozzle gun, inner mechanism, closing disc, and eliminating torque due to rifling, are discussed in these notes written by Biermann, Rheinmetall-Borsig.

PB 22635. BRITISH INTELLIGENCE OBJECTIVES SUB-COMMITTEE. Wear data summary for various guns calibre 2 cm-40.6 cm. Probable life for various foreign guns from 2 cm-10.5 cm when using German propellant. (Halstead Exploiting Centre Rept 730) n. d. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
The data on the probable length of life of foreign guns when using German propellants is given in tabular form. In German. This report may not reproduce well.

PB 22930. BROOKS, C. H. and others. Explosives: TNT manufacture and development work in Germany. (Naval Tech Mission in Europe Tech Rept 160-45) Oct 1945. 53 p. Price: Microfilm-$1.00 - Photostat-$4.00
This report is the result of an investigation of the TNT manufacturing plants at Allendorf, Schlebusch and Krümmel, operated by Dynamit A. G. Detailed information on manufacturing equipment and processes as well as new development work in progress was obtained. From this investigation it is concluded that the German TNT plants required longer time to build, were more expensive to construct, required more operating manpower, had no advantage in yield from raw materials, and had no important technical superiority when compared to the United States practice. Considered from the chemistry standpoint, there is striking similarity in the state of the art in the two countries. The total German TNT installed capacity was estimated at 55,000,000 lbs. per month and the estimated maximum monthly production was 49,800,000 lbs., made in Apr. 1944. Photographs, diagrams, and flow sheets are attached. Included is the translation of a report by Dr. Kunat of the Krümmel staff: "TNT manufactured at the Krümmel factory of Dynamit A. G."

PB 22932. CHAMBERLIN, H. A. and STODDARD, R. C. Fuse development for hollow charge bombs. (Naval Tech Mission in Europe Tech Rept 289-45) Oct 1945. 33 p. Price: Microfilm-50¢ - Photostat-$3.00
This report concerns the development by the Germans of a "discriminating" type fuse for use in hollow-charge bombs which would bring about detonation at the proper instant depending upon relative expenditures of initial velocity due to the nature of the target. Also, various modifications in the construction of the bomb body designed to obtain maximum effectiveness are described. (The hollow-charge bomb was never used operationally). Diagrams, photographs and graph are included.

PB 22946. FOGEL, H. M. and others. The development of scrap metal impregnated concrete munitions. (Naval Tech Mission in Europe Tech Rept 478-45) Sep 1945. 34 p. Price: Microfilm-50¢ - Photostat-$3.00
This report contains information on the development of scrap metal impregnated concrete munitions devised for the German Military as an aid to: (1) Fragmentation in certain anti-personnel weapons; and (2) the conservation of steel, coal, and manpower in the production of standard explosive ordnance. The report covers bombs, land mines, hand grenades, projectiles, and mortars, all of concrete particles. Although the primary reason for the development of concrete munitions was one of economy it was found that by the substitution of scrap-metal impregnated concrete, more effective fragmentation could be gained and in the case of many munitions the splinter effectiveness was substantially increased, also, in the case of many others, the same results could be obtained with considerably less expenditure of steel and explosives. The outcome of German research was that concrete munitions were well worthy of consideration in their own right as a weapon of war. Diagrams of various items are enclosed.

PB 18454. GERMANY. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Bericht A 149 G/1943 über versuche zur feststellung der auftreffwahrscheinlichkeit von flakgeschossen auf teile der fahrleitungsanlagen bei fliegerabwehr durch eisenbahnflak auf elektrisch betriebenen strecken. (Report A 149 G 194 about tests for the determination of the probability with which anti-aircraft projectiles of railroad mounted guns will hit the overhead system). (ALSOS Mission, RFK 302 c) Sep 1943. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
This report is about a test made with a moving-picture camera attached to the gun-carriage which recorded the position of the overhead lines in the firing line. The percentages of "hitting" the overhead system were different, depending from which direction the airplane would attack the gun. In German.

PB 22605. GRENELL, L. H. and others. Examination of enemy materiel (CD-113): Metallurgical and industrial examination of two Japanese 20 mm. aircraft mounted machine guns of 1941. Progress report 28, Dec 6, 1943. (OSRD Rept 3109. War Metallurgy Committee Rept M-194) Jan 1944. 57 p. Price: Microfilm-$1.00 - Photostat-$4.00
The report records the results of an examination of the Japanese Oerlikon type 20 mm. machine gun #94 for details of fabrication, treatment, type of raw material, and workmanship. A Japanese Navy Aircraft 20 mm machine gun #217 which was also examined was found to be identical in many cases with the first gun. The extensive use of protective coating and the forged receiver proved the most interesting items of these models of Japanese aircraft guns. Lavish use of highly alloyed Ni-Cr steel in small parts that would have hardened satisfactorily from plain carbon steel was noteworthy. Photographs illustrate the report. Test results are tabulated and economic consideration involved in manufacture of guns are discussed. This report was prepared at Battelle Memorial Institute.

PB 22616. GRENELL, L. H., and others. Examination of enemy materiel (CD-113): Metallurgical examination of a German 7.92 mm. semiautomatic rifle, Gewehr 41 (W). Progress report 38, Jan 21, 1944. (OSRD Rept 3263; War Metallurgy Committee Rept M-224) Feb 1944. 13 p. Price: Microfilm-50¢ - Photostat-$1.00

This report deals with an examination at Battelle Memorial Institute of a German semi-automatic rifle to determine the material and method of manufacture used in producing twenty-three critical parts of the weapon. No alloy steels were found. The rifle is suited to mass production methods. Heat-treated, unalloyed, high-carbon steels were used extensively in this weapon. The heat treatment seems to have been aimed for a high degree of hardness in some parts, which may account for the failures observed. Only two parts were case hardened, although this treatment is frequently used in other German small arms. The barrel was quenched and drawn to a sorbitic microstructure. Protection against rusting was the common gun black on the majority of exterior parts. Photographs illustrate the report. Data of chemical, spectographic and metallurgical analyses are tabulated.

PB 22584. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): A metallurgical examination of a German 50 mm. high explosive round. Progress report, May 12, 1943. (OSRD Rept 1492. War Metallurgy Committee Rept M-88) Jun 1943. 24 p. Price: Microfilm-50¢ - Photostat-$2.00

It was found, when a study of the subject round was made at Battelle Memorial Institute, that a low carbon deep drawing steel was used in making the steel cartridge case. For some reason, perhaps psychological, this case was electroplated with brass both inside or out. The projectile was machined from solid bar stock, similar to War Department 1060 analysis, without the addition of sulfur or lead to improve the machineability. Of particular interest was the use of a powdered iron driving band instead of the customary copper or duplex copper-iron band. The fuze bodies were made from a zinc base alloy containing 9 percent aluminum. Discussion of additional findings, economic considerations, photographs, microphotographs, and tables giving chemical and spectroscopic analyses are included.

PB 22587. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): A metallurgical examination of a German Gerlich armor piercing shell. Progress report, May 15, 1943. (OSRD Rept 1501; War Metallurgy Committee Rept M-91) Jun 1943. 13 p. Price: Microfilm-50¢ - Photostat-$1.00

Although the cartridge case was manufactured in 1940, it was produced from cartridge brass. It is probable that either the high pressure developed in firing or the tool situation prohibited the use of a steel cartridge case in this application. Of special interest was the use of a steel primer container. Reaction between the steel and the primer charge was prevented by a brass insert which held the explosive. This insert was made as a press fit and no weld was found between the brass and the steel. The projectile consisted of a tungsten-carbide core with an aluminum windshield and a steel case. In sintering the tungsten carbide, a minimum of nickel was used which produced a very brittle compact. No driving band is used on this type of projectile as the gun possesses a tapered barrel. Compression is maintained by two flanged skirts on the steel case which are machined in such a manner that they can be compressed while traveling through the tapered barrel. Results of chemical analysis are tabulated. Photographs are also included. This investigation was done at Battelle Memorial Institute.

PB 22604. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): Metallurgical examination of a German MG-34 machine gun of 1941. Progress report 25, Nov 12, 1943. (OSRD Rept 3017. War Metallurgy Committee Rept M-188) Dec 1943. 23 p. Price: Microfilm-50¢ - Photostat-$2.00

This report records the results of an examination at Battelle Memorial Institute of a German MG-34 machine gun for details of fabrication, treatment, type of raw material, and workmanship. The plastic stock and the brazed jacket assembly proved the most interesting parts of this model of the standard German machine gun. The majority of the metal parts of the gun were made from unalloyed steel. A number of parts, however, were found to contain nickel and chromium in amounts corresponding to the American Alloy SAE3435. Seventeen parts were produced by forging and machining, 92 parts were machined directly from bar stock, 32 parts were cut from wire, 42 parts were coiled wire springs, 15 parts were made from sheet metal by stamping, 1 part was cut from seamless steel tubing and 5 parts were molded from plastics. Photographs and drawings illustrate the text. Chemical and spectographic analysis and part data are presented in tabular form.

PB 22617. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): Metallurgical examination of a German Schmeiser submachine gun, 9 mm., model MP-40. Progress report 39, Jan 26, 1944. (OSRD Rept 3267; War Metallurgy Committee Rept M-225) Feb 1944. 15 p. Price: Microfilm-50¢ - Photostat-$1.00

The metal parts of the Schmeiser submachine gun, with one exception, were made from plain carbon steel. The extensive use of metal stampings and plastic parts was the most interesting manufacturing feature. High sulphur screw stock was used on a number of parts which were subject to light stress. The use of this material to facilitate machining has not been common in other types of German arms. Seventeen parts were heat treated, of which only two were case carburized. The use of heat treatment and of carburizing was relatively less than has been observed in other German small arms. Treatment of the metal parts to prevent corrosion consisted of the usual blue oxide gun-metal finish, probably applied with an alkali type of oxidizing bath. The five plastic parts in the grips, forearm, cooling bar, and spacer were excellent. These parts were all phenolic moldings laminated with paper, and show high strength and impact values. The German Schmeiser machine pistol is a submachine gun used by the German paratroopers. It is air-cooled, blow-back operated, shoulder or hip weapon, and is fed from a thirty-two round box magazine. Results of chemical and spectrographic analysis and of microscopic, macroscopic, and hardness tests are tabulated. Photographs are included. Examination of plastic parts was made by R. L. Wakeman of Mellen Institute of Industrial Research. Metallurgical examination was made at Battelle Memorial Institute.

PB 22601. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): Metallurgical examination of a 98-K Mauser rifle of 1941. Progress report 21, Oct 11, 1943. (OSRD Rept 2004. War Metallurgy Committee Rept M-164) Nov 1943. 14 p. Price: Microfilm-50¢ - Photostat-$1.00

The metal parts of this model of the Mauser rifle were, with few exceptions, made from plain carbon steel. Analysis of representative parts indicated that the basic open-hearth furnace was the source of most of the steel. Scrap metal formed a considerable part of the charge. Only one part of eight heat-treated parts contained sufficient aluminum to control the grain size of the steel during the heat-treating operation. No instance was found of the use of high-sulphur screw stock, although many of the parts required extensive machining operations. With the exception of the usual blue-oxide gun-metal finish on a number of parts, there was no provision for prevention of corrosion. Examination of the principal parts of the Mauser rifle for heat treatment showed that 17 parts were carburized, quenched and tempered; 16 parts were quenched and tempered; and 7 parts were untreated. A number of the heat-treated parts were quenched in the critical range, resulting in an undesirable ferrite-martensite microstructure. Practically all of the carburized parts appeared to have been treated in molten cyanide salts. Many of the carburized parts, such as wood screws and other non-moving parts, would appear to serve equally well without the added heat treatment. The stock and forearm were examined by the Forest Products Laboratory of the United States Department of Agriculture, and found to be of plywood construction, made from beech veneer glued with phenolformaldehyde synthetic resin. Results of chemical and spectroscopic analysis and of hardness and microscopic examination are tabulated. Photographs are included in this report prepared at Battelle Memorial Institute.

PB 22599. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): A metallurgical examination of a track link and typical bearings from German tanks. Progress report 19, Sep 20, 1943. (OSRD Rept 1963. War Metallurgy Committee Rept M-157) Oct 1943. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
A number of bearings and fittings from German light and medium tanks, and a complete link from the track of a heavy truck were analyzed and examined to determine the metal structure. All of the parts, with two exceptions, were made of conventional alloys according to accepted methods of fabrication and treatment. One important German oversight was the failure to properly harden the balls and the race in the bearing from the traversing mechanism of the medium tank. The second deviation from conventional practice was found in the use of Ni-Cr alloy in the cap screw of the retaining roller for the turret from the PzKw 1 tank. Although this in no way detracts from the utility of the part, it is surprising to find alloy steel where its use would not enhance the value of the article. Photographs, micrographs and tables of data from chemical and spectrographic analyses are included. This examination was made at Battelle Memorial Institute.

PB 22619. GRENELL, L. H., and others. Examination of enemy materiel (OD-113): A metallurgical examination of two German 15 cm. anticoncrete shells and carriers. Progress report 43, Feb 18, 1944. (OSRD Rept 3368; War Metallurgy Committee Rept M-336) Mar 1944. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
A metallurgical examination was made at Battelle Memorial Institute to determine the type and quality of material, manufacture, and workmanship of two inert German 15 cm. anticoncrete shells and ammunition carriers. All ferrous parts but two were manufactured from plain carbon steels which were probably produced in basic open-hearth furnaces. The projectile body and the base plug of the shell had higher manganese contents than are ordinarily encountered in plain carbon steels. The two shells differed significantly in a few respects which are enumerated herein. Several of the fuse parts were fabricated from duralium of 17S. The ammunition carriers for the two 15 cm. anticoncrete shells were identical and consisted of wicker baskets and wood-steel stools. Report includes photographs and diagrams and detailed data on parts of shells.

PB 22588. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): A metallurgical examination of two German 37 mm. high-explosive shells. Progress report, May 15, 1943. (OSRD Rept 1565; War Metallurgy Committee Rept M-100) Jul 1943. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
The examination of these shells showed that the Germans used normal alloys fabricated in the customary manner in fabricating these 37 mm. shells. Of particular interest was the use of aluminum and zinc-base alloys in the corresponding parts of the two fuse assemblies. Photographs illustrate the report. Results of chemical and spectographic analysis are tabulated. This investigation was made at Battelle Memorial Institute.

PB 22615. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): Metallurgical examination of welded armor plate - German PzKw III tank. Progress report 38, Dec 31, 1943. (OSRD Rept 3236. War Metallurgy Committee Rept M-212) Feb 1944. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
An arc-welded assembly of German flame-hardened 32 mm. armor plate and 17 mm. homogenous plate was examined metallurgically and found to be of excellent quality Cr-V-Mo steel joined by a poor weld. The poor quality of the weld and the use of a ferritic type of welding rod indicates a possible shortage of the nickel necessary for the austenitic type of welding rod used in the United States. This report was prepared by Battelle Memorial Institute. Photographs and diagrams illustrate the report which includes a discussion of results and economic considerations.

PB 22622. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): A metallurgical study of a 28/20 mm. German gun barrel. Progress report 37, Jan 8, 1944. (OSRD Rept 3257. War Metallurgy Committee Rept M-219) Feb 1944. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
The examination of the Gerlich 28/20 mm. gun barrel at the Battelle Memorial Institute showed the use of a hammer-forged standard gun alloy. A microexamination was made of cross sections showing the structure of the bore surface as altered by firing. This examination showed a well-defined white layer on top of a relatively shallow heat-affected zone. This type of structure is usually associated with one or both of the following: 1. The use of a relatively 'cool' single base powder; 2. A very short heating period as might be associated with high velocity projectiles. In either case the structure is characteristic of guns that erode relatively slowly. The hammer-forged chromium-molybdenum steel in the gun barrel approximates standard gun barrel steels, but has high chromium. While the tests at Aberdeen Proving Ground indicated that the gun barrel might have a relatively long service life, the machining operations involved would be costly. In addition, the arrowhead ammunition used in the gun is made from critical materials. Up to the present time there has been no widespread use of the Gerlich type gun; perhaps the results obtained do not balance the time and materials used in its production. Chemical and spectrographic analyses of 28/20 mm. gun barrel and physical properties are tabulated. Photographs and diagram of Vickers hardness impressions are included.

PB 22597. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): A survey of various German ammunition carriers. Progress report 17. (OSRD Rept 1865; War Metallurgy Committee Rept M-144) Sep 1943. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
These ammunition carriers were probably made in widely scattered factories converted from such peacetime pursuits as furniture and metal cabinet manufacture. The three general types are wood, fiber, and sheet-steel construction. Metal carriers would seem to be the most desirable for their ruggedness, fire protection, and corrosion prevention. Wooden carriers are probably the cheapest to manufacture, and use a minimum of essential material. The wicker carrier may be the strongest for a given weight, but it offers little protection from either water or fire and must take more man-hours than the other types to produce. The quality of workmanship and materials is fair to excellent. The steel used in the construction of the three metal carriers was analyzed chemically and the results reported in Table 1. The hardness of the steel in the ammunition carriers was determined by Vickers Diamond Penetrator and the reports recorded in Table 2. The steels that were finished by cold rolling are somewhat harder than the hot-rolled steel sheet. Photographs accompanied by descriptive data are included.

PB 22596. HENDERSON, A. S., and others. Examination of enemy materiel (OD-113): Metallurgical examination of German (Rheinmetall) aerial bomb fuses. Progress report 16. (OSRD Rept 1853) Sep 1943. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
The construction, workmanship, and materials used in producing these aerial bomb fuses are excellent and indicate a standardized acceptable design that was thoroughly proved for the start of the present war. Changes that occur from year to year in the manufacture of these fuses are minor, made to achieve increased functional uses and ease of fabrication. The materials used were many and varied, and appear to be the best obtainable. In a few instances the construction is unnecessarily complicated according to American standards, and would not be suitable for machine fabrication; however, a few improvements have been made to eliminate machine tool operations. Photographs and tables are included.

PB 22629. KUNZLER. Haensler's dissertation on electric guns. (BIOS Halstead Exploiting Centre Rept 204) n. d. 25 p. Price: Microfilm-50¢ - Photostat-$2.00

This report was translated by F. Marks from a German document. Projectile velocities obtainable with powder are limited. A whole range of practical spheres of application would be opened if the initial velocity of projectiles could be successfully increased. The only method known is acceleration of the projectile by electrical means. The most promising electrical system which might serve for the acceleration of projectiles originated with the Frenchman, Fauchon-Villiplee, and a model was tested by the "Gesellschaft für Geräteban". Experiments were still in progress when this report was written. Results obtained can be seen from the experimental reports issued by the Company, the last of which is dated January 18, 1945. Since the electrical field so far has not offered storage batteries with a concentration of energy equal to that afforded by powder, it is no use thinking of making the electric gun compete with the powder gun in range of velocities proper to the powder gun. On the other hand there are possibilities of introducing the electric gun where the powder gun must fail on account of the initial velocity of the projectile being too low. The electric gun could be used for anti-aircraft guns, long-range guns or as the firing device for giant rockets. The theory of the electric gun and considerations for its tactical adoption and its further development are discussed. Drawings and graphs are included.

PB 22631. MUCK, OTTO. Short report on electric gun. Supplementary report 1. (BIOS Halstead Exploiting Centre Rept 206) Jun 1943. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
This is a translation by Dorsch and Wilton of a "most secret" German document which contains information regarding new developments in the electric gun. A new method of connecting the condenser coils, which makes it possible to avoid a separate power supply and permits the electric gun installation to be connected to any high tension grid, is described. This makes the gun considerably more mobile. Increase in the length of the barrel facilitates all conditions of operation (better efficiency, smaller recoil, smaller coil forces); It was decided that the electric gun should be used as a horizontal "runway" for the electric gun projectiles, and not in the high angle position formerly used. The final course of the projectile is determined by a directed expulsion of a gas-jet on the stern of the projectile, which ignites after leaving the electric gun. This exercises on the projectile a revolving and directional moment of definite direction in space which can be exactly determined and thus keep it in its course. A new process was developed which makes possible an essential increase in the resistance of certain insulating materials. These new features and their advantages and a number of new problems are discussed and the possibility is noted of applying the starting principle to rocket projectiles. Drawings, and plotted curves showing the comparison of arrow projectiles with various initial velocities are included. A map of "Fortress Europe" with its defensive zones surrounded by the range lines for 1000 km. and 2000 km, which show the strategic importance of these electric guns is presented.

PB 22618. REICHELDERFER, CHARLES A., and others. Examination of enemy materiel (OD-113): Metallurgical examination of tungsten carbide cores from German armor-piercing projectiles. Progress report 40, Jan 13, 1944. (OSRD Rept 3268; War Metallurgy Committee Rept M-226) Feb 1944. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
Examination of the tungsten carbide cores from the German armor-piercing ammunition for the period 1940 to 1942 shows a change in processing of these parts. Cores dated 1940 and 1941 show the use of hot compacting and sintering processes with a small amount of nickel in the composition. Cores dated 1941 and 1942 indicate the use of a process producing a cast structure, with no nickel and the use of columbium. It seems probable that this change in processing was made to facilitate production with little, if any, decrease in quality as both types compare favorably as to hardness, density, and toughness. The quality is not comparable to grades used for cutting tools, but apparently was considered adequate by the Germans for this application. The cores were examined by X-ray diffraction studies, microexamination, and determination of the density, hardness, and chemical composition. The results of this examination are tabulated. Photographs are included. This report was prepared at the Battelle Memorial Institute.

PB 23369. U. S. STRATEGIC BOMBING SURVEY. Tank industry report. (Rept 78) n. d. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
This report begins with a history of the German tank production industry from 1935 to 1942, when losses from all causes exceeded production for the first time. Late 1943 and 1944 saw great bombing damage and dispersal of plants, and a greatly stepped-up government sponsored production program. An evaluation of the direct and indirect damage to this program by the late 1944 concentrated attacks, indicates that the area raids caused greater production stoppage than the industrial plant bombings, though the effective bombing of transportation facilities had important indirect effects. The use of high explosive bombs, followed by incendiaries before the debris could be cleared, caused the greatest damage, though fragmentation bombs also caused much damage to machine tools. Tables of plant production, and of bombing attacks are correlated in final tables.

Italian

PB 22609. HENDERSON, A. S. and others. Examination of enemy material (OD-113): Metallurgical examination of an Italian 20 mm. antitank Solothurn rifle. Progress report 31, Dec 14, 1943. (OSRD Rept 3126) Jan 1944. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
Twenty-six representative parts of this Italian gun were examined at Battelle Memorial Institute for details of fabrication, treatment, materials, and quality of workmanship. The author states that while the quality of workmanship, precision, and care of machining were good, the design of many of the parts examined was unnecessarily complicated, required a large amount of time-consuming and costly machining operations and was hardly suitable for economical mass-production fabrication methods. All the surface hardened parts were hardened by carburization. Nearly all the parts analyzed, which constitute at least 80% of the total weight of the gun, were made of either basic open-hearth or basic electric alloy steel, containing 3 - 4% nickel and about 1% chromium, although the parts were small enough to harden fully in carbon or else in low alloy steel. Included are discussions of findings and economic considerations; descriptions of fabrication and assembly, microstructure, and materials used; photographs; and tabulated data.

Japanese

PB 22004. BARTHOLOMEW, R. L. and others. Examination of enemy materiel (OD-113; AC-77; M-119): Metallurgical investigation of Japanese 37 mm tank gun. Progress report 184, May 31, 1945. (OSRD Rept 5357; War Metallurgy Committee Rept M-559) Jul 1945. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
An examination of the tube and breech block of a Japanese 37 mm tank gun, No. 842, dated 1941, was conducted by the Massachusetts Institute of Technology to determine metallurgical and mechanical properties, chemical analysis, and method of manufacture. Both gun components are forgings of a steel approaching SAE 3130 and are in the air cooled condition. They have low strength and relatively poor impact properties. Table 1 presents translation of Japanese markings on gun, Table 2 chemical composition, Table 3 hardness surveys and Table 4 tensile properties of tube and breech block. Table 5 presents V-notch charpy impact tests of tube for this gun. Drawing of the tube and photograph of the breech block are included, as well as other photographs and graphs.

PB 22598. ORNELL, L. H., and others. Examination of enemy materiel (OD-113): Metallurgical examination of Japanese 37 mm. round nose, A. P. ammunition. Progress report 18, Sep 9, 1943. (OSRD Rept 1942; War Metallurgy Committee Rept M-148) Oct 1943. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
A metallurgical examination was made to determine the type and quality of material, manufacture and workmanship of an unfired, inert, Japanese 37 mm., armor-piercing, high-explosive projectile and brass cartridge case. The ammunition

seems to have been hastily designed and manufactured to serve the 37mm. antitank gun. The base detonating fuse in the projectile was probably intended for a much larger shell, as it occupies the major portion of the explosive cavity. The fuse is an impact detonating type, armed by setback, and does not have adequate safety features. Numerous copper and brass parts are used, many of them in places where less critical metals would serve as well. Results of chemical and spectographic analysis are tabulated. Photographs, photomicrographs, and charts of Vickers hardness survey are included. This examination was made at Battelle Memorial Institute.

PB 22600. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): Metallurgical study of two samples of Japanese welded homogeneous light armor. Progress report 20, Sep 27, 1943. (OSRD Rept 1966. War Metallurgy Committee Rept M-158) Oct 1943. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
Two samples of Japanese welded homogenous light armor plate were examined for composition, structure, and the nature of the weld. The alloy content was found to be astonishingly high, especially in molybdenum, sufficient to make the steel air hardening. Photographs and microphotographs are included. Results of chemical and spectographic analysis and data of comparative hardness value are tabulated. This examination was made at the Battelle Memorial Institute.

PB 22007. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77) (M-119): Metallurgical examination of a Japanese aircraft 20 mm "Browning type" machine gun. Progress report 182. May 1, 1945. (OSRD Rept 5228; War Metallurgy Committee Rept M-544) Jun 1945. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
High-carbon, medium-carbon, tungsten and nickel-chromium steels were used in the manufacture of the 20 mm. machine gun. About 18% of the parts were made from a 1.80 - 2.30% tungsten; 0.67 - 0.97% carbon steel and two parts were made from an alloy equivalent to SAE 3370. The steels were made in the basic open-hearth or electric furnace with scrap forming a large part of the charge. In general, the design, materials, and methods of manufacture were similar to those used in a Japanese .50 cal. gun manufactured in November, 1942, and previously examined (Metallurgical examination of a Japanese aircraft 12.7 mm Browning machine gun, OSRD No. 4178). The chief differences were the increase in carbon content of the tungsten steels and the deterioration of workmanship, especially in machining and grinding, in the later model 20 mm. Browning. Table 1 contains the analyses of some of the steel parts of the gun; and Table 2 is a breakdown of all the parts with respect to weight, hardness, analysis and heat treatment, manufacture and markings. Photographs are included.

PB 22002. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77; M-119): Metallurgical examination of a Japanese 20 mm aircraft machine gun. Progress report 190, Jun 19, 1945. (OSRD Rept 5410) Aug 1945. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
This gun was a modified design of the 20 mm aircraft machine gun described in OSRD Report No. 4064. Some parts were slightly different in design, but no major metallurgical changes were evident. Parts were formed by conventional methods, and numerous high-alloy steels were used. The use of flame-hardened tungsten steel parts for abrasion resistance remained the most prominent feature of the gun. The weights, hardnesses, heat treatments and methods of manufacture are given in Table 1. Chemical and spectrographic analyses of selected parts are shown in Table 2. Photographs are included.

PB 22008. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77-M-119): Metallurgical examination of a Japanese 50 mm mortar grenade smoke shell and fuse. Progress report 189, Jun 14, 1945. (OSRD Rept 5409) Aug 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
Machined, plain-carbon steel bar stock in the annealed or as-rolled condition was used in making the smoke shell. Fuze parts were machined from extruded Munts metal bar stock. The rotating band was cut from commercial copper tubing, pressed into position, and held in place by embedded steel wire pins. Table 1 presents metallurgical data on Japanese 50 mm type 91 mortar grenade smoke shell with type 89 fuse (BMI #846 and 855 - CKE #7124 and 7125), and Table 2 presents analyses of parts from Japanese 50 mm mortar grenade smoke shell (BMI #846 - CKE #7124). Photographs are included.

PB 22691. HENDERSON, A. S. and others. Examination of enemy materiel: A chemical and metallurgical examination of a section of Japanese body armor. Progress report 12, Jul 22, 1943. (OSRD Rept 1694) Aug 1943. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
The chemical analysis of this steel was somewhat unusual and did not conform to any of the standard steels used in this country. Of special interest was the high molybdenum (0.49%), and low carbon (0.14%) content. Since a rather high hardness was obtained (401 Vickers Brinell), an effort seems to have been made to obtain maximum toughness at an appreciable hardness level. The ballistic properties of this armor were reported by the Ordnance Department to be excellent. Chemical and spectrographic analysis and photographs are included.

PB 22607. HENDERSON, A. S. and others. Examination of enemy materiel (OD-113): Metallurgical examination of 6.5 mm. Japanese light machine gun. Progress report 30, Dec 8, 1943. (OSRD Rept 3116; War Metallurgy Committee Rept M-203) Jan 1944. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
The metal parts of this Japanese light machine gun were made from plain carbon and low alloy steel. Analyses of representative parts indicate that the steel was made in a basic open-hearth furnace. Elements present are those normally added in the making of scrap heats or present as residual elements in scrap melting stock. The only exceptions are a few parts which contained 2 to 2.5 percent tungsten, and two that had chromium in percentages slightly higher than the residual amount commonly found in this country. No high-sulphur, free-machining steel was found. Fabricating methods in general are similar to those that would be used in this country, although welding and brazing could have been used more, with savings in time and manpower and no loss in effectiveness. Plates were welded to the bottom of the bipod, the socket for the stock was welded to the trigger guard, and a reinforcing plate was brazed with alpha brass into the butt plate. Metallographic examination showed that 22 parts had been quenched and tempered (some had been differentially hardened), and most of the remainder had been annealed, normalized, or left in the condition of the raw material. None of the parts had been carburized. Tables give details of manufacture, data from Japanese handbook TM30-48, listing of springs from Japanese 6.5 mm. light machine guns. Photographs are included. This report was prepared at the Battelle Memorial Institute.

United States

PB 23546. ALBRING, W. Basic theories for determining angles of attack on bodies of revolution by pressure measurements. (AAF ATSC T-2 Translation 521) Feb 1946. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
As long as it is not possible to determine, during flight tests, especially in unmanned devices, the trajectory angles by direct measuring, a gap exists between model measuring and full scale test which has to be bridged in order to make full practical use of the experience gained by model tests. In devices which have been constructed as bodies of revolution, such as bombs and torpedoes, the pressure measuring can be done directly on the body. During flight tests, the pressure measurements can be made by means of probes of a construction similar to bodies of revolution. The aim in establishing theoretical relations was to manage with as few test points as possible. In this report the possibility is investigated of determining the angle of attack and the induced angle of attack by means of several pressure gangings at the head or

at the cylindrical center part of bodies of revolution exposed to flow. From the equations for the pressure course on bodies of revolution in an ideal fluid, it is possible to derive simple relations which can serve as a basis for a calibration of the bodies for angular measurements in viscous and vortical fluid. A bibliography, diagrams, and plotted curves are included. This translation of a captured German document was made by Irma Leibiger and edited by L. W. Bosart.

PB 22861. BEEK, JOHN, JR. The design of granulation for rocket powder. (OSRD Rept 1264; NDRC Armor and Ordnance Rept A-150) Feb 1943. 25 p. Price: Microfilm-50¢ - Photostat-$2.00

The purpose of this report is to bring together certain relations between the performance of a rocket and the geometric form of its propellant and chamber. The effects on velocity and burning distance of certain variations in the design of propellant charges are discussed. The principal subject treated is the relation between the web thickness of powder and the maximum obtainable velocity. It was found that, in general, increasing the web thickness permits an increase in the velocity. If the form of the charge is restricted to a single tubular grain, there is an optimum web thickness with respect to a maximum velocity obtainable. This optimum thickness depends on the pay load to be carried and the diameter of the propellant chamber. Tables, mathematical equations and plotted curves are included.

PB 22865. BEEK, JOHN, JR. Some problems of heat transfer in rockets. (OSRD Rept 1359); NDRC Armor and Ordnance Rept A-166) Apr 1943. 37 p. Price: Microfilm-50¢ - Photostat-$3.00

In the 4½ inch rocket with burster tube, which is the principal device considered in connection with the theoretical discussion presented in this report, particular interest attached to the effect of the heating on the high explosive in the burster tube. Calculations indicate that the trap wires reach an average temperature of more than 1000° C. in the hottest cross section; that the wall of the burster tube reaches a temperature of about 350° C. a fraction of a second after the charge is fired, which temperature is high enough to cause TNT to detonate; and that a thin layer of insulating material on the outside of the burster tube is adequate to keep its temperature below a safe limit. Tables, mathematical equations and plotted curves are included.

PB 22866. BLITZER, LEON. Effect of wind on the mean deflection of rockets. (OSRD Rept 1361; NDRC Armor and Ordnance Rept A-169) Apr 1943. 15 p. Price: Microfilm-50¢ - Photostat-$1.00

In calculating the dispersion of rockets in range or in deflection for any set of firings, corrections should be made for the deflection of the mean of the pattern due to the influence of the wind on the motion of the projectiles. On the basis of certain simplifying assumptions, formulas were derived and are presented in this report for the effects of wind on the motion of rockets with velocities less than 800 ft/sec. The effects are considered first for the burning period of the rocket and then for the flight after burning. The formulas developed apply to the mean deflection for a given set of firings of a sufficient number of rounds that malalinement and other such effects average out. Tables, diagrams and plotted curves are included. A list of symbols is given.

PB 22864. BOWEN, I. S. and others. The effects of fin size, burning time and projector length on the accuracy of rockets. (OSRD Rept 1330; NDRC Armor and Ordnance Rept A-164) Mar 1943. 36 p. Price: Microfilm-50¢ - Photostat-$3.00

A theoretical analysis of the forces acting on a rocket during its accelerating period is presented in this report. Part I of the report gives a brief survey of the problem and findings under the headings: Causes of inaccuracy of rockets; solution of equations and discussion of results; limitations of the theory and trajectory during burning. Part II is a study of the forces acting on a yawing projectile and includes discussion of the aerodynamic force system, equations of motion, solutions of equations of motion, and fin effects of various projectiles. The following conclusions were reached: (1) For projector lengths less than one-fifth the burning distance the dispersion of a rocket increases rapidly with the burning time until the burning time equals the period of oscillation of the projectile in free flight. (2) In the same range of projector lengths, increasing the fin size from that required to make the projectile barely stable in free flight to that which reduces the period of oscillation to the burning time diminishes the dispersion by a factor of about 0.7. (3) When the ratio of projector length to burning time distance is in the range between 0.01 and 0.050, the dispersion decreases roughly linearly with the logarithm of this ratio. Plotted curves showing the effect of fins and of projector length on the deflection of rockets, and deflection of trajectory in the plane of yaw, tabulated data and diagrams are included. A list of symbols is given.

PB 22106. BUSHKOVITCH, A. V. Ricochet of cal. .30 cylinders on striking an earth surface. (Aberdeen Proving Ground Ballistic Res Lab Rept 499) Nov 1944. 20 p. Price: Microfilm-50¢ - Photostat-$2.00

Cal. .30 steel cylinders, of length .2 and .5 inches, were fired at an earth surface in order to determine the percentage of ricochets at various striking angles and velocities, and the angles and velocities of ricochet. The striking velocities varied from about 1000 f/s to about 4000 f/s and the striking angles were 4°, 6° and 9° 30'. The percentage of ricochets was 100 percent at 4° and 6°, at all velocities, but 9° 30' was close to the angle at which ricochets cease, since less than 50 percent of the .5" cylinders and less than 20 percent of the .2" cylinders ricocheted at the lower velocities and none at the higher velocities. The percentage of striking velocity retained after ricochet was between 40 percent and 85 percent at 4° and 6° and about 25 percent at 9° 30'. The percentage loss in velocity was greater with .5" cylinders than with .2" cylinders and greater at 6° than at 4°. It was also greater at lower than at higher velocities. The vertical ricochet angle was usually greater than the striking angle by a factor from 1 to 1.6 for .2" cylinders and from 1 to 2 for .5" cylinders. The lateral deflection averaged between 1.5° and 2° for the .2" cylinders and between 2° and 4° for the .5" cylinders. Tables and graphs are included.

PB 20290. COLUMBIA UNIVERSITY. DIVISION OF WAR RESEARCH. STATISTICAL RESEARCH GROUP. Two memoranda on double dichotomies: Statistical analysis of double dichotomies (I-18-3AR), and Number of trials necessary for comparing percentages (3-6-3AR). (Rept 8; OSRD Rept 1588; NDRC Applied Math Panel Rept 10) Mar 1943. 32 p. Price: Microfilm-50¢ - Photostat-$3.00

The problem in the first memorandum is whether the new method of firing trials which shows 33-1/3 percent more hits than the old method can be expected to yield more hits in the long run; or whether its superiority in this experiment ought to be regarded as mere chance, in the sense that two series of trials with the same method would often differ as much. The problem set forth in the second memorandum consists of the problem from the previous memorandum plus a second problem, namely, to determine the number of trials to be made with each method. With regard to the problem of testing the significance of an observed difference in percentages, the method advanced in the Memorandum of the Special Board on Naval Ordnance, dated Jan 20, 1943, entitled "The statistical significance of percentages of successful results in limited samples" is satisfactory for large samples. It is not quite the same as the more correct and equally simple methods given in the first memorandum herewith, but for large samples it leads to essentially the same conclusions. For small samples the method of the Special Board's memorandum is not adequate, and either the exact test or the chi test corrected for continuity which are explained in the first memorandum herewith must be used. With regard to the problem of determining sample size, the method given in the Special Board's memorandum is correct. Its usefulness for practical work, however, is restricted because it implicitly assumes the

data to be already at hand, whereas the practical problem is to determine the sample size before the experiment is performed, and because it assumes the proportions observed in the experiment to be the true long-run proportions. The present memorandum presents another procedure for determining sample size; and a monogram is given for simplifying the calculations. This procedure indicates that extremely large samples are required for a reasonable degree of confidence in the superiority of one method if the two methods being compared differ only a little (as, for example, when the true probabilities are 0.015 and 0.02). Since the indicated sample sizes may in such cases lie far beyond the bounds of feasibility, it may be necessary in practice to make certain compromises, that is, the practical problem is likely to be that of making the best of a sample of given size (i. e., minimizing the risk of a wrong conclusions). Graph is included.

PB 22860. DAVIS, LEVERETT, JR. The dependence of the masses of rocket components on their dimensions. (OSRD Rept 1260; NDRC Armor and Ordnance Rept A-149) Feb 1943. 29 p. Price: Microfilm-50¢ - Photostat-$2.00
A method is presented by which rocket motors and propellent grains can be designed to satisfy given specifications, particularly velocity, under certain simplifying assumptions. A system of curves appearing in illustration No. 1 (in an envelope attached to cover) is used in finding values of the various parameters. In one appendix a typical problem is worked out. A list of symbols is given in a second appendix.

PB 22863. DAVIS, LEVERETT, JR. and MILLS, CHESTER D., JR. Dependence of the mass of propellent in a rocket motor on the web thickness and the motor dimensions. (OSRD Rept 1319; NDRC Armor and Ordnance Rept A-163) Mar 1943. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
The mass of propellant that can be placed in a rocket motor as a function of the dimensions of the charge and of the motor is given in a general graphical form that will serve for motors of any diameter. Indeed, the shape of the motor need not be cylindrical since effective diameter, defined so that $\pi D^2/4$ is the cross-sectional area of the empty chamber, is considered. Limiting curves for grains having no central perforation and for grains with maximum possible outer diameter are plotted in terms of the dimensionless quantities X, Y and λ for a single grain, two concentric grains and for two to six identical grains arranged in a ring around the motor. Details of the calculations are given. The subject covered in the appendix is construction of curves. Curves are included to illustrate the text of the report.

PB 20707. EHRENFELD, DAY. Development of the chloracetophenone candle. (Edgewood Arsenal Chemical Div Rept 160) May 1922. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
A candle has been developed for training or other purposes that is capable of producing an intensely lachrymatory but non-persistent cloud. This candle contains about 135 grams of chloroacetophenone and 240 grams improved Military Rifle .30 cal. smokeless powder, with about 12 grams magnesium oxide as a stabilizer. It is ignited by a quick burning matchhead and a scratch block. Other powders in different proportions were tested and, with the exception of duPont smokeless and shotgun powder, were found to be unsatisfactory. The report gives directions for mixing the charge, loading and using. Four drawings of the candle and complete specifications are included.

PB 22087. FELSZTYN, TADEUSZ. How are the best results obtained, with respect to dispersion in small arms fire? (Aberdeen Proving Ground Ballistic Res Lab Rept 131) Nov 1939. 80 p. Price: Microfilm-$1.00 - Photostat-$6.00
This report was translated by H. P. Hitchcock from the German in "Zeitschrift fur das gesamte Schiess-und Sprengstoffwesen", 33, Nos. 1-5 (1938), which had been translated from the original work of Dr. Felsztyn in Nos. 29 and 30 of "Wiadomoschi Technicsne Uzrbrojenia" (1935). The object of this work was to find the mathematical laws which connect the dispersion of a weapon with the probable results of firing under given conditions. The work is divided into nine chapters. The first chapter is devoted to the study of the dispersion with respect to the range. The second chapter treats the relation between the total dispersion and the probable error. Chapter III comprises the probable value of a single shot, in shooting at the ring target. In chapter IV, the author finds the result of a single shot. This result is different from the probable value, because the center of impact does not, in general, coincide with the middle of the target. Chapter V collects the causes of aiming errors, and shows how these must be taken into account, according to the firing conditions, by calculating the probable results of fire. Chapter VI treats the influence of the position of the gunner, with respect to dispersion, and, finally, gives practical rules for the calculation on the band, considering various weapons, and also the conditions which are met in the military as well as the sporting shooting. Chapter VII brings forth practical rules for the calculation, with sufficient specification of numerical coefficients. These coefficients are so selected that the results of calculation give a value, which, in practical shooting, does not surpass 50% of the shots but only 30%. Thus, the upper limit and the mean result of calculations are obtained. The author also clarifies the principles which have brought him to these processes. In chapter IX, the author explains a system of shooting instructions which had been proposed in the "Przeglad Piechoty" (Infantry Review). He continues that, with this system, according to the calculation accomplished by the foregoing rules, more is desired of the rifleman than his weapon is capable of giving. Hereby, the author expands about the means which can contribute to raising the military assurance of hitting, and is moved to repeat the doctrine which has served to uphold the proposed system of shooting. Tables and graphs illustrate the text.

PB 22088. HITCHCOCK, H. P. Aerodynamic nomenclature and formulas, conversion factors and drag functions. (Aberdeen Proving Ground Ballistic Res Lab Rept 111) Jul 1938. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This report proposes a revision of certain terms and definitions in the field of aerodynamics to make Aberdeen Proving Ground terminology more nearly conform to current usage. Part I is a proposed list of terms, agreeing in general with those used by T. J. Hayes in his "Elements of Ordnance". Part II gives some important formulas, which indicate the relations among the symbols and serve to define certain terms. Part III contains conversion factors. Part IV, giving the forms of the six types of projectile for which drag functions have been tabulated, is missing from this copy.

PB 22043. HUSS, H. O. Installation tests of M17 and M33 airplane spray tanks mounted under the wings of the B-17 and B-24 airplanes. (CWS Tech Div Memo Rept 704) Jul 1943. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
These tanks conform in general dimensions and methods of suspension to the 4,000-lb. bombs. The object of the tests described in this report was to determine the angular position of the bands carrying the suspension lugs and to develop a discharge line which will give a satisfactory installation of the M17 and M33 airplane spray tanks when mounted under the wings of B-17 and B-24 airplanes. On the basis of various tests it was recommended that the M-17 tank be standardized for use on the planes mentioned and that the M33 tank use the same discharge line as the M17. Photographs and drawings are appended.

PB 22047. HUSS, H. O. Wing installations of spray tanks M10 and M33 on the B-25D airplane. (CWS Tech Div Memo Rept 675) Jun 1943. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
The object of the work described in this report was: 1) To develop a satisfactory method of mounting M 10 spray tanks on the wings of the B 25 D airplane, and to investigate the feasibility of mounting the M 33 spray tank on the wings of this airplane. 2) to obtain spray panel data for wing tank installations on this airplane. It was concluded that four M 10 tanks could be carried on the airplane, or that two M 33 tanks could be installed on the wings of the plane. The background and a complete description of these tests is presented in this report. The text is illustrated with photographs of installations on the plane and of test panels.

PB 22091. KENT, R. H. Method for determining the resistance function of a projectile when pursuing a high angle trajectory. (Aberdeen Proving Ground Ballistic Res Lab Rept 5) Feb 1935. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This report presents a method for obtaining the resistance function of a projectile when pursuing a high angle trajectory. Knowledge of this resistance function is essential if computation of accurate wind correction for high angles of fire are to be made. In addition to the detailed program for testing the recommended method which is given in this report two memoranda criticising the method are attached. A brief refutation of the criticism is also given.

PB 22100. KENT, R. H. The most economical sample size. (Aberdeen Proving Ground Ballistic Res Lab Rept 96) Jan 1938. 73 p. Price: Microfilm-$1.00 - Photostat-$5.00
It is the purpose of this study to formulate a procedure by which the most economical sample size for a test of a given lot or grand lot of an ammunition component may be determined. Sampling procedures and findings are described. The most economic sample size has been calculated for certain typical kinds of specifications and components both when the sampling is done by attributes and variables. If occasion should require it, there would be no great difficulty in extending the theory to include other types of specifications, e. g., testing with retests permitted, testing when no failures are permitted, etc. Graphs, an appendix, and a list of symbols with their meanings are included.

PB 22096. KENT, R. H. On some sources of error in piezo-electric and crusher gauge measurements. (Aberdeen Proving Ground Ballistic Res Lab Rept 26) Dec 1935. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
An attempt was made to integrate some pressure-time curves for the caliber .50 machine gun. Upon integrating these curves, travel-time curves were obtained. However, it was impossible to get the bullet to the muzzle as soon as its arrival was indicated by the muzzle contact without assuming a negative forcing resistance for at least part of the travel. Since it seemed obvious that there could not be such a negative forcing resistance, a search was begun to discover the causes of the discrepancy. Investigation has shown that the load on the crystal stack of the piezo-electric gauge is very appreciably reduced by the obturating cup, by an amount depending approximately on the ratio of the thickness of the cup to the diameter of the piston and on the pressure. It has also been shown in the case of a piezo-electric gauge the cylindrical surfaces of which are exposed to fluid pressure, that a binding of the piston may result which tends to make the gauge reading low, if the calibration by a dead load method as a Riehle testing machine is depended upon. The crusher gauges should also be affected by these influences. Methods of reducing or eliminating these errors are suggested. Graphs are included.

PB 22089. KENT, R. H. Pressure measurement of war reserve caliber .30 model 1906 ball ammunition. (Aberdeen Proving Ground Ballistic Res Lab Rept 2) Feb 1935. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
Pressure measurements were made of three lots of 1906 Ball ammunition included in the War Reserve in comparison with a lot in current use at Aberdeen Proving Ground. Nothing abnormal was found about the behavior of the War Reserve ammunition. Pressure measurements were made in two ways: (a) by crusher gauge; and (b) by crusher and piezo-electric combination. Results obtained are shown in tables and oscillograms.

PB 22090. KENT, R. H. Study of ignition of 155 mm gun in connection with Project KV 260: Study of the factors involved in the design of propelling charges. (Aberdeen Proving Ground Ballistic Res Lab Rept 4) Feb 1935. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
Piezo-electric gauge records were taken of the firings of a number of 155 mm gun charges having different characteristics. Variations were made in the amount and kind of igniting powder, the type of propelling powder, and the arrangement of the charge. It was found that for every type of round appreciable pressure oscillations of approximately equal magnitude were obtained with the following exceptions; namely, the charges of strip powder, a stacked charge of multi-perforated powder and a charge of multiperforated powder in which the front increment was considerably increased in size resulting in the base section's having a much smaller diameter than normal. It is believed that the use of the types of charges which give a smooth pressure-time curve should result in the reduction of the velocity dispersion of this gun. A study of the records shows that the muzzle velocity probable error of the 155 mm G.P.F. gun, which is a very important weapon, is on the average about 7 f/s. It is obviously desirable that this muzzle velocity dispersion should be reduced. The description of the charges with respect to powder, igniter, arrangement of charge, etc., are tabulated. Copies of firing records and curves are included.

PB 22092. KENT, R. H. Time required for powder to attain the temperature of the constant temperature magazine. (Aberdeen Proving Ground Ballistic Res Lab Rept 6) May 1935. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
Measurements were made of the time required for the powder in the box to attain temperature equilibrium in a magazine, according to the observations, approximately 48 hours. Theoretical calculations were made; according to these, 96 hours would be required. It is then shown that no reliance can be placed on the observations since too large lead wires were used for the resistance thermometers. The measurements were repeated using finer lead wires, and 65 hours were required. It is shown that the time required for a cylindrical box to attain equilibrium should vary approximately as the square of the diameter of the box. The influence of radiation on the heat transfer is also investigated. Simple formulae are given for the time required for the powder to attain approximate equilibrium temperature. An appendix entitled "The average temperature of the powder in a cartridge case as dependent upon the previous temperatures of the case," and charts giving required time for powder in various containers are included.

PB 22117. KENT, R. H. and MCSHANE, E. J. An elementary treatment of the motion of a spinning projectile about its center of gravity. (Aberdeen Proving Ground Ballistic Res Lab Rept 459) Apr 1944. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
The first twelve pages of this report are taken without change from an earlier report by Mr. Kent (Ballistic Research Lab Rept 85). In these pages the equations of motion are derived for a projectile traversing a rectilinear trajectory and acted on by drag, cross-wind force and overturning torque only. The method of determining the stability factor is given. In the latter section of the report the damping and precessional yaw are discussed in the light of recent developments. A bibliography is included.

PB 22086. KENT, R. H. and RENO, F. V. Errors in the trail resulting from ignoring either the measured time of flight or the measured range. (Aberdeen Proving Ground Ballistic Res Lab Rept 143) Apr 1939. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
Expressions for the errors in the trail, range, deflection and time of flight resulting from ignoring either the measured time of flight or the measured range are deduced. Results of calculations of the resulting errors in trail, time of flight, range and deflection for the bomb M38A2 are presented. The desirability of the introduction of a ballistic coefficient, C_A, based on trail is mentioned. The reliability and the sources of the discrepancy between the ballistic coefficients deduced from range and time of flight respectively are discussed. Two different procedures have been used to determine the trail of a bomb from observation on certain elements of its trajectory. One procedure uses measurements of the range and ignores the measured time of flight. The other procedure uses measurements of the time of flight and ignores the range. In addition to these two procedures, the document describes procedures which are theoretically simpler than those actually used. Drawings, tables and curves complete the report.

PB 18855. KINCAID, J. F. and DAILEY, B. P. An apparatus for the arrested burning of gun propellants: Progress report. (OSRD Rept 1836) Sep 1943. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
This report from the Explosives Research Laboratory, Bruceton, Pa., presents a description of a convenient apparatus for recovering partially burned powder grains. A discussion of the procedure is included, as well as some results of typical burning trials. The technique is found to be a more rigorous test of compounding procedure than any of the less direct examinations of physical properties in use at the explosives Research Laboratory at this time. Compounding flaws leading to burning defects are usually observable in conventional colloided propellants prior to inspection of partially burned grains. Such flaws are less readily observed in propellant compositions containing a high proportion of crystalline material, such as British Cordite N, and many apparently perfectly compounded grains have been shown to develop severe flaws on burning. The arrested burning technique described is thus an especially valuable tool for a development study of such compositions. Drawings, photographs and table of burning characteristics of compositions are included.

PB 22085. LANE, J. H. Dependence of muzzle velocity on certain characteristics of rotating bands. (Aberdeen Proving Ground Ballistic Res Lab Rept 153) Jun 1939. 29 p. Price: Microfilm-50¢ - Photostat-$2.00
This report is a study of the effect of banding, band hardness, band seat diameter and contour, on velocity and velocity uniformity. The banding of 155 mm howitzer proof slugs was tested first. Later 75 mm pack howitzer projectiles were studied. In view of the apparent effect of banding, band seat diameter, knurling, etc. on the muzzle velocity it was recommended that a thorough study be made of the entire subject. Diagrams, photographs, and test data tabulations accompany the report.

PB 22029. LOEW, T. and MITCHELL, C. T. Development of incendiary projector for airplanes. (CWS Tech Div Memo Rept 909) Oct 1944. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
The object of the work described in this report, was to develop a weapon for destroying enemy ground installations by discharging ignited fuels from an airplane at low altitudes. The apparatus developed consisted of a bomb-like container holding 210 gal. Pressure to eject the thickened gasoline or oil fuel was obtained by smokeless powder rocket motors installed at one end of the container and fired electrically in series. Emerging fuel was ignited by a powder ring around the nozzle. The unit was called the aeroflame projector K1. As a result of the tests it was concluded that 1) Aeroflame, as developed, is a workable munition, but additional development is needed. 2) it is not superior to droppable gasoline tanks. Photographs and design drawings are included.

PB 22035. LOTT, E. E. FS smoke curtains from airplane spray tanks M10 and M33. (CWS Tech Div Memo Rept 805) Mar 1944. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
The objects of the series of tests described in this report were: 1) To determine from what height a satisfactory smoke curtain can be produced by spraying FS from M10 and M33 spray tanks; 2) to compare the curtains produced by these two tanks; 3) to determine whether a satisfactory curtain can be obtained from the M33 tank by reducing the rate of discharge and thus increasing the length of the curtain, and 4) to compare the curtain produced by FS thickened with ammonium sulfate and that produced by unthickened FS under similar conditions. Test results are fully described, tabulated, and illustrated by photographs. No material advantage was found in the use of ammonium sulfate as a smoke thickener. A drawing is included.

PB 22031. LOTT, E. E. FS smoke curtains from airplane spray tanks, supplementary tests with restricted discharge. (CWS Tech Div Memo Rept 898) Sep 1944. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
The objects of the series of tests described in this report were: 1) To determine the most practical method of restricting the discharge rate; 2) to determine the size of restrictions to be used for both tanks M10 and M33 when spraying either one tank or two tanks simultaneously from altitudes of 50-75, 150 and 250 ft; 3) and to determine the length of the curtain that can be produced when spraying under the different conditions mentioned above. It was found that the most practical and efficient method of reducing the discharge rate from tanks M10 and M33 is to restrict the discharge opening by an orifice in compressed asbestos gasket material 1/8-in. thick. The two tanks tested were found to be about equally efficient. A history, description and discussion of these tests is given in the text which also contains complete tables of test results and many sets of photographs of smoke screens produced under different test conditions as well as photographs of test installations.

PB 25617. MESCHTER, H. F. Attempted preparation of bis chloromethyl bis beta chloroethylthio methane. (Edgewood Arsenal Chemical Div Rept 312). Jun 1924. 11 p. Price: Microfilm-$1.00 - Photostat-$1.00
An attempt was made to prepare bis chloromethyl bis beta chloroethylthio methane by the reaction between symmetrical dichloroacetone and beta chloroethyl mercaptan under the influence of dry hydrochloric acid gas. Purification of the crude product by distillation and various methods of crystallization from pure and mixed solvents was unsuccessful. The work involved the preparation of monothio ethylene glycol, beta chloroethyl mercaptan, and symmetrical dichloroacetone as intermediates. The study was discontinued since it was apparent that either the reaction took place in such a manner that a number of by-products were formed which could not be separated by ordinary means or the compound itself was so unstable that it could not be isolated by the usual methods.

PB 22036. MITCHELL, C. T. Development of delay buckle release on cluster adapters for small bombs. (CWS Tech Div Memo Rept 795) Jan 1944. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
The object of the work described in this report was to develop a means for modifying any standard type of cluster adapter so as to obtain a free fall of approximately 2,000 feet after release from the airplane before permitting the cluster to open. The device developed consisted of a section of 1-in. tube inside of which is a small tube containing a duPont 12-sec. delay detonator. It is operated by a pull-wire attached to the bomb shackle. The two delay units are mounted on either end of the cluster and held in place by longitudinal steel straps, the top strap arranged to prevent the buckles on the adapter from opening even though free of the arming wires. The functioning of the detonator causes the flanges of the units to separate. This releases the pressure on the adapter buckles and permits the cluster to fall apart 12 seconds after it leaves the airplane. Photographs and blueprints are included.

PB 22870. NORDHEIM, L. W. and others. Thermal effects of propellent gases in erosion vents and in guns. (NDRC Armor and Ordnance Rept A-262; OSRD Rept 3447) May 1944. 222 p. Price: Microfilm-$2.50 - Photostat-$15.00
This report is intended to give a comprehensive discussion of thermal effects of propellent gases. The theory of heat transfer between gases and solids is reexamined, and the laws for heat transfer under the extreme conditions occurring in ballistics are derived. A quantitative theory of erosion in vent experiments is given. It is shown that surface melting occurs in vents as a consequence of the heat transfer, and that all detailed results on the relative erodibility of various materials and the change of erodibility with the severity of conditions can be fully explained on the basis of the melting mechanism. The laws of heat transfer are then used to calculate the heat input and temperatures in guns. The use of a suitable system of interior ballistics allows us to obtain complete distribution functions of the temperature as it depends on time, distance from the bore surface and position along the bore. A system of tables has been prepared for the determination of temperature distributions for all guns under practically all variations of parameters.

These are presented in the last chapter of this report together with a full description of procedure so that the tables may be used without reference to the remainder of the report. An absolute scale has been obtained by making use of the results of heat-input measurements on special guns. A bibliography is included.

PB 22033. ORTYNSKY, H. L. Ignition of oil slicks on water. (CWS Tech Div Memo Rept 814) Mar 1944. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
The object of the work described in this report was to adapt the M47A1 or M47A2, 100-lb. incendiary bomb for use in the ignition of oil slicks upon water and also for use against wet, but easily inflammable targets. After various drop tests it was concluded that: 1) Heavy oil slicks can be ignited by means of the present incendiary oils; 2) the small oil incendiary bombs, M69, will ignite slicks when sodium is included in the incendiary oil filling; 3) the M47A1 or M47A2, 100-lb. incendiary bomb gives satisfactory ignition on land and water when used with a sodium filled M13 type burster; and 4) the adaptation necessary for the use of M47A1 and M47A2 bombs against oil slicks is the insertion of a special igniter tube filled with sodium in the M1o burster. Tabulated data on tests is included.

PB 22470. PIGFORD, R. L. The laboratory mortar, its design and use for studying the disintegration of thickened vesicant solutions. (OSRD Rept 3542) Apr 1944. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
A laboratory instrument has been designed which simulates on a small scale the action of chemical shells and aircraft spray tanks. The apparatus uses a .45-cal. blank cartridge to expel a 2-cc. volume of liquid vesicant into still air at a velocity of about 289 ± 15 ft./sec. The liquid may be photographed as it breaks into drops, or the spray may be collected on sheets of thin, absorbent filter paper and a drop size spectrum determined from measurements of the stains. Low-speed airplane spraying may be predicted within probable limits of ± 10% from the results of a laboratory test on a small sample. Approximately equivalent results are obtained for thicker samples. Bibliography, table, diagrams, photographs and graphs are attached.

PB 22471. PIGFORD, R. L. The use of thickened vesicants in chemical shells, a literature survey. (OSRD Rept 3543) Apr 1944. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
From the results of this investigation it is felt that the several advantages which might be realized from the use of thickened agents in shells warrant field trials of ground-burst weapons in which comparative tests of thickened and unthickened chargings would be made under identical conditions. Bibliography and tables are attached.

PB 22101. RENO, F. V. The motion of the axis of a spinning shell inside the bore of the gun. (Aberdeen Proving Ground Ballistic Res Lab Rept 320) Feb 1943. 52 p. Price: Microfilm-$1.00 - Photostat-$4.00
Considerable work had been done on a thorough and comprehensive treatment of the motion of a spinning shell about its center of mass exterior to the muzzle. In order to obtain aerodynamic coefficients from jump-card or spark-photographic measurements from the extensive theory given in the various reports it is necessary to make use, among other quantities, of the magnitude of the first maximum yaw. The magnitude of the first maximum yaw is currently measured and a completely satisfactory prediction of it is difficult to obtain since it depends upon a number of phenomena which takes place inside the bore, at the muzzle and just beyond the muzzle. This report gives a general relation between the first maximum yaw and the yaw on emergence due to the yaw due to clearance and its time derivatives. General equations of motion for the axis of the shell inside the core are derived, an elastic impulse for the rebound of the bourrelet from a land top is developed and expressions are derived from which the yaw on emergence due to the yaw due to clearance can be computed. The theory obtained is based upon the use of Lagrange's equations for constrained motion with finite forces and with impulsive forces. A critical quantity, somewhat analagous to the stability factor of exterior ballistics, is derived, whose magnitude determines whether the shell will rebound or slide on the lands. The jump due to the yaw due to clearance and its orientation are deduced. It is considered that a better prediction of the first maximum yaw exterior to the gun can be made by use of these results and exterior phenomena, such as anomalous jump and irregular initial yaws, can be explained more satisfactorily than has hitherto been possible. The proper characteristics of the shell to modify in order to reduce balloting in certain guns are believed to be indicated by some criteria given in this report. Diagrams and graphs illustrate the report. See PB 22102.

PB 22867. ROSSER, J. BARKLEY. Fin opening. (NDRC Armor and Ordnance Rept A-247; OSRD Rept 3232) Feb 1944. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
In a number of rockets the fins are closed while the rocket is in the projector, but fly open when the rocket emerges from the projector. A common fin design is indicated in an illustration copied from blueprint of the Budd 4½-in. rocket fin; in it the hinge and the center of gravity of each fin are so located that the acceleration of the rocket will open the fins. Once the fins are open, the air will hold them open. It has been suggested that the air drag is an important factor in opening the fins, but such is not the case as discussed in sections 10 and 13. Should it seem desirable to get the fins open more quickly, one can put a spring under each fin, or drill a small hole into the nozzle under each fin, thus providing an auxiliary jet. The purpose of this paper is to present formulas by means of which one can determine the times of fin openings under a variety of conditions. Drawings, tables, graph, and a list of symbols are included.

PB 22104. SACHS, R. G. The dependence of blast on ambient pressure and temperature. (Aberdeen Proving Ground Ballistic Res Lab Rept 466) May 1944. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This report considers the effect of external atmospheric conditions on the blast from an explosive. It is assumed that a change in these external conditions leads only to a change of the scale of pressure, distance, and time. It is further assumed that except for this change of scale the total energy in the blast wave is independent of the external conditions. The result of these considerations is a generalized law of a similitude, namely, the blast pressure measured in units of the atmospheric pressure, P, is a function of $\sqrt[3]{P/W}\,R$ and $\sqrt[3]{P/W}\cdot\sqrt{T}\,t$ only, where W is the charge weight, T is the absolute ambient temperature, R is the distance from the explosive, and t is the time after detonation. This result obtains only if external conditions such as the height above the ground, which acts as a reflecting surface, are scaled properly. If the blast effect of explosives detonated in the neighborhood of airplanes in flight is considered, the absence of ground reflection reduces the effective weight of the explosive by a factor or two. Thus it is found that, if the peak blast pressure at a given distance from the explosive is p at sea level, then the pressure at the same distance from the explosive at an altitude such that the atmospheric pressure has been reduced by a factor $\pi(\pi<1)$ is approximately $p' = \sqrt{\pi/2}\,p$. If the absolute temperature of the atmosphere at this altitude is less by a factor θ than the sea level temperature, the ratio of the impulse above sea level to that obtained on the ground is $\pi^{1/3}/(\sqrt[3]{4}\sqrt{\theta})$. A further result of these considerations is that changes in temperature may lead to a positive impulse under extreme winter conditions which is 8% greater than the positive impulse obtained under extreme summer conditions.

PB 22034. SENTER, JOHN. Test of mechanized flame thrower E7. (CWS Tech Div Memo Rept 807) Mar 1944. 28 p. Price: Microfilm-50¢ - Photostat-$2.00

The X7 flame thrower mounted in a light tank was tested under unfavorable weather conditions during a period limited to five days. The maximum range achieved was 151 yards. The ranges at various gun elevations were plotted, and complete results of the tests tabulated. Due to the limited data obtainable, significant conclusions regarding the operation of the flame could not be drawn from these tests. Performance of the flame thrower is markedly influenced by adverse winds and variations in the consistency of the fuel. The mechanical difficulties encountered indicated the need of further development work. Detailed description of the equipment and its operation, photographs, drawings and tables are included.

PB 22102. THOMAS, L. H. The motion of the axis of a spinning shell inside the bore of the gun. (Aberdeen Proving Ground Ballistic Res Lab Rept 544) May 1945. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
The yawing motion of a projectile about its center of mass inside the tube of a gun is considered on the basis of three assumptions: (a) The projectile is symmetrical and is centered at the driving band; (b) the total rotation of the projectile is fixed by its travel and the rifling of the gun; and the force system due to gas pressure and driving band is equivalent to a force at the center of the driving band and a torque about an axis which bisects the angle between the axis of the projectile and the axis of the bore; (c) when the bourrelet does not rub against the bore, no other forces act on the projectile, and when the bourrelet rubs on the bore, the latter exerts on the bourrelet a normal reaction and a frictional resistance in a direction opposite to the direction of sliding. It is concluded that an ordinary projectile with band well behind the center of mass will be yawed so that the bourrelet touches the bore, and that the plane of yaw will process in reverse direction to the rifling at a rate less than the turn of the rifling. In the exceptional case of a projectile with band nearly over the center of mass, gyroscopic forces may pick the bourrelet from the side of the bore and tend to straighten up the projectile in the gun. In another exceptional case of small distance from band to bourrelet and large coefficient of friction between bourrelet and bore, the reverse procession of the plane of yaw may increase in unstable fashion leading to large yaw due to clearance outside the gun. Diagrams illustrate the report.

PB 22774. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Bomb, G.P. 100 lb., AN-M30. Jul 1944. 40 p. Price: Microfilm-50¢ - Photostat-$3.00
This report describes a method employed as of Apr 1944 at the Iowa Ordnance Plant of loading, assembling and packing of the bomb, 100 lb. G.P., AN-M30 with fin assembly (straight TNT loaded). Lists of parts and materials are given. Photographs showing each step, with explanatory notes, are used. Machines, tools, gages, etc. used are listed on pertinent operation sheets.

PB 22758. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Booster, M20A1 and M21A4. Oct 1944. 56 p. Price: Microfilm-$1.00 - Photostat-$4.00
This document describes the method of loading, assembling and packing the Booster, M20A1 and M21A4 according to the methods used at the Sangamon Ordnance Plant as of September 1944. Photographs illustrate each step of the procedure. Machine, tools, gages, etc, which are used in the operations, are listed on the operation sheets.

PB 22773. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: 4.2 inch chemical mortar shell, H.E., M3 (TNT loaded). Dec 1945. 67 p. Price: Microfilm-$1.00 - Photostat-$5.00
A method of loading, assembling and packing of this chemical mortar shell is described in detail. The information given is based on methods used at the Louisiana Ordnance Plant, as of July 1945. Numerous photographs of equipment and operations illustrate the instructions, and a list of parts and materials is included. Machines, tools, gages, etc. used are listed on pertinent operation sheets.

PB 22752. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Fuse, bomb nose AN-M126A1. Jul 1944. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
This report describes a method employed as of Jan 1944 at the Arkansas Ordnance Plant of loading, assembling and packing the AN-M126A1 bomb nose fuse. Lists of parts and materials and of equipment and tool manufacturers are given. Photographs showing each step, with explanatory notes, are used. Machines, tools, gages, etc. used are listed on pertinent operation sheets.

PB 22754. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Fuse, bomb, tail, AN-M100A2, AN-M101A2 or AN-M102A2. Apr 1944. 34 p. Price: Microfilm-50¢ - Photostat-$3.00
This report describes a method employed as of Jan 1944 at the Arkansas Ordnance Plant of loading, assembling and packing the tail bomb fuzes AN-M100A2, AN-M101A2 or AN-M102A2. Lists of parts and materials, and of tool and equipment manufacturers are given. Photographs showing each step, with explanatory notes, are used. Detailed inspection instructions are given. Machines, tools, gages, etc. used are listed on pertinent operation sheets.

PB 22759. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Fuse, flare, mechanical time, M111A2; and fuse, bomb nose, mechanical time, M155. Apr 1945. 54 p. Price: Microfilm-$1.00 - Photostat-$4.00
This is a description of the operations in the loading, assembling, and packing of above fuzes and is based on methods used at the Arkansas Ordnance Plant, Jacksonville, Arkansas, as of April 1, 1945. Each operation is described on a separate sheet which includes lists of equipment and materials needed, number of personnel needed and rate of production. Numerous photographs of equipment and operations illustrate the instructions.

PB 22762. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Fuse, P.D., M48A1. Jun 1944. 139 p. Price: Microfilm-$1.50 - Photostat-$10.00
This manual describes the methods of loading, assembling, and packing the point detonating fuse which were in use at the Arkansas Ordnance Plant as of January 1944. Photographs illustrate every step of the process described. Machines, tools, etc., actually used are listed on pertinent operation sheets. Tool and equipment drawings available are listed.

PB 22757. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Fuse, P.D., M52B1 or M53. Aug 1944. 73 p. Price: Microfilm-$1.00 - Photostat-$5.00
This document describes the method of loading, assembling and packing the P.D. fuse M52B1 or P.D. fuse M53 according to the methods in use at the Iowa Ordnance Plant as of April 1944. Photographs illustrate every step of the process described. Machines, tools, gages, etc. which are used in the operations are listed on the operation sheets.

PB 22753. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Fuse, P.D. M75 for 20 mm, H.E.I., M97. Nov 1945. 48 p. Price: Microfilm-50¢ - Photostat-$4.00
This report describes a method employed as of Aug 1945 at the Kingsbury Ordnance Plant of loading, assembling and packing of the fuse, P.D. M75 for 20 mm, H.E.I., M97. Photographs showing each step, with explanatory notes are used. Lists of parts and materials and detailed inspection instructions are given. Machines, tools, gages, equipment, etc. are listed on pertinent operation sheets.

PB 22755. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Fuse, P.D., MK 27. Sep 1944. 64 p. Price: Microfilm-$1.00 - Photostat-$5.00

A step-by-step method of loading, assembling and packing the above point detonating fuse is given in this report. It is based on methods used at Wolf Creek Ordnance Plant as of May 1944. The procedures outlined herein were compiled for use as a guide by other loading contractors, and include lists of parts and materials, and photographs of equipment and operations. Machines, tools, gages, etc. used are listed on pertinent operation sheets. A list of available tool and equipment drawings is given.

PB 22760. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Load: shot, unfixed, A.P.T., M95 (T935); shell, unfixed, incendiary M96 (T18); shell, H.E.I., M97 (T23); and complete round assembly and packing: Cartridge, A.P.T., M95 for 20mm guns; cartridge, incendiary M96 for 20 mm guns; cartridge, H.E.I., M97 with fuze P.D., M75 for 20 mm guns; cartridge, T.P. M99 for 20mm guns. Nov 1945. 182 p. Price: Microfilm-$2.00 - Photostat-$13.00
This manual describes a method of loading 20 mm rounds of shot, shells, and method of assembling and packing cartridges according to the methods used at the Kingsbury Ordnance Plant as of August 1945. Photographs illustrate the various steps of the processes described. Machines, tools, gages, etc., actually used are listed on pertinent operation sheets.

PB 22768. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Primer detonator, M14. Apr 1945. 92 p. Price: Microfilm-$1.00 - Photostat-$7.00
This report describes a method employed as of April 1945 at the Arkansas Ordnance Plant of loading, assembling and packing of primer detonators, M14. Photographs of each step, with explanatory notes, are used. Detailed inspection instructions are given. A list of drawings is given.

PB 22767. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Primer, M36A1. May 1944. 48 p. Price: Microfilm-50¢ - Photostat-$4.00
The method of loading, assembling and packing the primer described in this manual is that in use at the Arkansas Ordnance Plant as of January 1944. Photographs illustrate each step of the procedure. Machines, tools, etc., actually used are listed on pertinent operation sheets. Tool and equipment drawings available are listed.

PB 22766. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Primer, percussion M33 or M34. May 1944. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
This manual describes a method of loading, assembling, and packing the percussion primer by methods used at the Iowa Ordnance Plant as of April 1944. Photographs illustrate each step of the procedure. Machines, tools, gages, etc., which are used, are listed on pertinent operation sheets.

PB 22855. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Projectile, A. P. 12 in., Mk. XVI. Dec 1943. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
A method of loading, assembling and packing this projectile is described. The information given is based on methods used at the Green River Ordnance Plant, as of August 1943. Each operation is described in detail and is accompanied by photographs. Machines, tools, gages, etc. used are listed on pertinent operation sheets. Lists of parts and materials and of tool and equipment drawings and manufacturers are given.

PB 22769. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Propelling charge assembly for 120 mm gun M1. Jul 1944. 41 p. Price: Microfilm-50¢ - Photostat-$3.00
This report describes a method employed as of July 1944 at the Kansas Ordnance Plant of loading, assembling and packing propelling charge for 120 mm gun M1. Photographs of each step, with explanatory notes, are used. A list of tool and equipment drawings is given.

PB 22886. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Rocket, target, A. A., 3.25 in., M2. Nov 1944. 49 p. Price: Microfilm-50¢ - Photostat-$4.00
Detailed descriptions of the consecutive operations used in the loading, assembling and packing of these rockets are given in this report. The information given is based on methods used at the Wolf Creek Ordnance plant as of May 1944. Photographs of equipment and operations and lists of parts and materials accompany the descriptions. Machines, tools, gages, etc. used are listed on pertinent operation sheets.

PB 22771. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Round, complete, shell, H.E., M49A2 for 60 mm mortar. Sep 1944. 67 p. Price: Microfilm-$1.00 - Photostat-$5.00
A method for loading, assembling and packing complete rounds of this mortar shell is described herein. The information given is based on methods used at the Wolf Creek Ordnance Plant, as of May 1944. Each operation is outlined on a separate sheet which includes lists of parts and materials, the number and classification of personnel needed and rate of production. Numerous photographs of equipment and operations accompany the instructions. A list of available tool and equipment drawings is given.

PB 22765. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Round, complete, shell, H.E., 90 mm, M71. Jun 1945. 78 p. Price: Microfilm-$1.00 - Photostat-$6.00
This manual describes a method of loading, assembling and packing 90 mm high explosive shells according to methods used at the Sangamon Ordnance Plant as of May 1945. Each step of the procedure is illustrated by photographs. Machines, tools, gages, equipment, etc. actually used, are listed on pertinent operation sheets.

PB 22772. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Round, complete, shell, H.E., M43A1 (with fuze, P.D. M52B1); and round, complete, shell, H.E., M56 (with fuse, P.D. M53) for mortar, 81 mm. M1. Jun 1944. 92 p. Price: Microfilm-$1.00 - Photostat-$7.00
This document describes a method of loading, assembling and packing the shell rounds for the 81 mm mortar in use at the Iowa Ordnance Plant as of April 1944. Photographs illustrate each step of the procedure. Machines, tools, gages, etc. actually used are listed on pertinent operation sheets.

PB 22763. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Signal, aircraft, single star, M44A1. Aug 1945. 88 p. Price: Microfilm-$1.00 - Photostat-$6.00
This manual contains information relative to the loading, assembling, and packing of the above mentioned aircraft signal according to the methods used at the Universal Match Company plant, Ferguson, Missouri, as of July 1945. Photographs illustrate each step of the process described herein.

PB 22761. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Signal, ground, amber star, parachute, M21A1. Apr 1945. 51 p. Price: Microfilm-$1.00 - Photostat-$4.00
Detailed step-by-step instructions are given in this report for the preparation of the necessary chemicals and for the loading, assembling and packing of this signal. The information was based on the methods used at the International Flare and Signal Company Plant at Tipp City, Ohio, as of March 1944. The instructions are preceded by a list of parts and a list of materials. Machines, tools, gages, etc. used are listed on pertinent operation sheets.

PB 22892. U. S. WAR DEPARTMENT. Gun, machine, cal. 0.50 Browning, M2 firing cartridge, armor-piercing-incendiary, cal. 0.50, M8. (Firing Tables 0.50AA-T-1) Feb 1, 1946. 65 p. Price: Microfilm-$1.00 - Photostat-$5.00

These tables are computed for a ballistic coefficient of 0.389 based on a special resistance function determined for the cartridge, API, M8. Dispersion and drift data were determined from firings conducted during June and July 1945 at Aberdeen Proving Ground, Maryland, and recorded in APG Firing Record No. S-42915. The standard muzzle velocity for a new gun is 3045 f/s. These tables are computed for a muzzle velocity of 3000 f/s which takes some account of the loss in velocity due to erosion. The book is divided into two sections: Part 1, Data for antiaircraft fire; and Part 2, Data for ground fire. Appendices contain trajectory and time curves and trajectory and safety limit chart.

PB 22362. WEATHERBY, B. B. Effects of subsurface detonations in earth. (OSRD Rept 1312; NDRC Armor and Ordnance Rept A-160) Mar 1943. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
Data have been obtained on the relationship between the size of craters and the weight of explosives causing them; on the lateral extent of the zones of permanent deformation around the crater; on the displacement velocity and acceleration of the surface as well as on the wave form in close proxicity to an explosion. Such information may prove of value not only in the design of bomb shelters and fortifications, but also in the formulation of methods for increasing the effectiveness of bombs. A series of charges of dynamite ranging from a fraction of a pound to 185 lb. were shot in the black loam of north-central Oklahoma. Careful measurements of the crater sizes disclosed that their radius varied as the cube root of the explosive weight. The zones of permanent deformation extended to approximately twice the radius of the crater. Detectors for picking up the waves generated by the explosions were of the moving coil type, and consequently they recorded the velocity of the wave vibrations. Because of the limitation of 0.3 cm on the movement of the coil, it was not possible to work as near to the explosion as was desired. Accelerations and displacements were obtained by differentiating and integrating the records graphically. A number of records are shown on which comparisons can be made of the wave form of the horizontal and the vertical components. It will further be noted that when the detectors were planted only a few feet below the surface, the frequency of the waves increased considerably, indicating the absorption of the higher frequencies by the surface material. Curves are given that indicate the rate at which the displacements, velocities and accelerations decreased with increase in distance from the shot. Tables and graphs are included.

PB 22041. WEAVER, F. R. and MITCHELL, C. T. Development of airplane smoke tank, wing type: Preparation and test of samples. (CWS Tech Div Memo Rept 725) Sep 1943. 72 p. Price: Microfilm-$1.00 - Photostat-$5.00
The object of the work described in this report was to complete the development and testing of samples of the wing type chemical spray tank for use in the dissemination of liquid chemical agents from airplanes. This report assembles all the hitherto unconnected and unreported data concerning the wing tank development up to the standardization of the M10 wing tank in 1940. This tank has been standardized for use with A-20A and similar airplanes. Tables, a bibliography and photographs are included in the report.

PB 20710. WILLIAMS, C. M. The development of a combination hand and rifle grenade for the dispersion of toxic smokes. (Edgewood Arsenal Chemical Div Rept 166) Nov 1922. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
Two toxic smoke mixtures have been developed which function satisfactorily in the combination hand and rifle grenade. The time of volatilization with both mixtures is less than one minute and the fuse time is about four seconds. Full directions for loading and assembling, specifications and drawings are included in the report.

PACKING AND PACKAGING

PB 15352. SMITH, BROOKS F. Report of surveillance tests of specially treated fiber containers for the storage of CC No. 2. (CWS Tech Div Memo Rept 159) Feb 1939. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This report gives data concluding that certain of the containers manufactured by the Carpenter Container Co. are satisfactory, and further that deterioration of such containers takes place after the wax of rubber coating is penetrated by chlorine vapors from cc No. 2.

PB 22751. U. S. PICATINNY ARSENAL, DOVER, N.J. Description of manufacture: Fuze, bomb, nose, AN-M103. Nov 1944. 114 p. Price: Microfilm - $1.50 - Photostat - $8.00
This report describes a method employed at the Sangamon Ordnance Plant as of Sep 1944 of loading, assembling and packing of the fuze, bomb, nose, AN-M130. Lists of parts and materials are given. Photographs showing each step, with explanatory notes, are used. Detailed inspection instructions are given. Machines, tools, gages, etc. actually used are listed on pertinent operation sheets.

PB 20556. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Supplemental report of test of "Tri-Sure" closure for drums, inflammable liquid, 55-gallon. (Project T-150) Jul 1943. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Procedures and findings of tests are described. The June 1943 report (PB 20557) recommended that the "Tri-Sure" closure be considered superior to the wide flanged, flat gasket type closure with respect to sealing characteristics; that the standard flat gasket be considered stronger and more durable than the "Tri-Sure" gasket; and that consideration be given to designing a closure to eliminate the objectionable features of both types of the present closures. The supplemental report (PB 20556) presents additional facts pertaining to the test and recommends that the "Tri-Sure" closure be considered superior in general utility to the wide flanged, flat gasket type closure with respect to the availability of tools with which to operate the closures.

PAPER AND ALLIED PRODUCTS

PB 19699. HUTCHEON, N. B. Interview with Dr. Barchfeld, chemist at Dynamit A.G. at Troisdorf. (BIOS Final Rept 161, Item 22) Sept 1945. 13 p. Price: Microfilm-50¢ Photostat-$1.00
Dr. Barchfeld, Chemist at Dynamit A.G., Troisdorf, in working on fillers for phenol resins, developed a method of making fibre boards having various physical properties, from waste fibres without any added binder. It was also found that such boards could be rendered water-repellent by heating to just below the charring point. Data are given on the physical properties of these materials, called Tronal, when prepared in various ways. Information is also given on the preparation, use and properties of Dynal, the phenol-resin-bonded, laminated, paper product made by Dynamit A.G. and used principally for aircraft sheets. The paper used for Dynal had the resin incorporated in it in the paper making process and required no dipping. Limited information was obtained on the use of Tronal as a substitute for balsa wood in aircraft construction.

PERSONNEL APTITUDE TESTING AND JOB TRAINING

PB 20286. CLARK, R. E. and others. The effects of sleep loss on performance of a complex task. (OSRD Rept 3153; NDRC Applied Psychology Panel Rept 67; Project SOS-6, Memo 3). Sep 1943. 19 p. Price: Microfilm-50¢ - Photostat-$2.00

This project memorandum, prepared under NDRC contract of Tufts College covering research on fatigue in service jobs, presents the results of experiments in which subjects were required to go without sleep for 50 hours. Because only three subjects could be tested at a time, the experiment was repeated three times. The experiment is regarded as a preliminary test of the hypothesis that observers would show signs of fatigue (decrement in efficiency of performance) when periodically tested in the performance of a psychologically complex task during a period of sleep-deprivation. Graphical representation of the performance of the nine observers tested indicates a decrement in efficiency. Efficiency in performance of complex psychological tasks suffered a significant decline during the course of 50 hours wakefulness. Procedure and findings of tests are described. Schematic diagram of apparatus used, and graphs of scores of performance are included.

PB 19785. HARVARD UNIVERSITY. PSYCHO-ACOUSTIC LABORATORY. The problem of selecting and training personnel for communication in intense noise. (OSRD Rept 987). Nov 1942. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
This report presents evidence relative to the problem of selecting and training the most competent personnel for interphone and radio communication in planes, ships, and tanks. Individuals differ widely in their ability to speak intelligibly and to understand what is being spoken in conditions of intense noise. A proposed experimental program for devising short tests measuring ability and aptitude in this field is outlined. Tables and graphs showing individual differences in listening and speaking ability are included in the report.

PB 20284. HOFFMAN, ARTHUR C. and MEAD, LEONARD C. The performance of trained subjects on a complex task of four hours duration. (OSRD Rept 1701; NDRC Applied Psychology Panel Rept 29; Project SCG-6, Memo 1). Jul 1943. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
This project memorandum reports the results of a four-hour experiment in which subjects worked steadily at a complex mental task requiring the continuous matching of dials as well as periodic adjustment of peripheral apparatus. This experiment was planned to test the hypothesis that observers would show signs of fatigue (decrement in efficiency of performance) when continuously engaged for relatively long periods of time in a task of psychological complexity. No significant changes in performance were observed over the four-hour period of the present experiment. Procedures and findings of test are described. A schematic diagram of the apparatus used, and graphs, are included. This investigation was part of research on fatigue in service jobs carried on at Tufts College under NDRC contract.

PB 19819. KELLEY, TRUMAN L. An activity-preference test for the classification of service personnel. Final report. (OSRD Rept 4484; NDRC Applied Psychology Panel Rept 407). Dec 1944. 168 p. Price: Microfilm-$2.00 - Photostat-$12.00
This report shows the successive steps taken by Harvard University in devising and developing an activity-preference test which for each person tested furnishes a number of different scores corresponding to clusters of functionally-related activities. Psychologists both in and out of the Army collaborated in selecting and judging the importance of interest, attitude, and preference dimensions in connection with known facts about individual differences and about differences in need, especially military need. These dimensions were classified and combined and, after preliminary correlation and reliability study, were reduced to 34, which are designated rubrics. Some 3800 enlisted men in three Army camps were tested, and those between the ages of 19 and 26 inclusive were scored on the 34 rubrics. The prospective fields of utility of the test are in connection with the induction, classification and assignment of enlisted personnel, special service demands, the rehabilitation, training and placement of discharged military personnel, and nonmilitary personnel whose activities have been disrupted through industrial retrenchment or reconversion. The following appendices are included in the report: A. Sources examined and utilized with reference to rubrics and items; B. rubric definitions and weights; C. directions for administering; D. test booklets and answer booklet; E. rubric scoring keys; F. selected abstracts from monthly progress reports; G. component scoring keys. Tables and charts of profiles are included.

PB 22933. RIEFFERT, J. B. Tests for selection of personnel in German industry. (Naval Tech Mission in Europe Tech Rept 300-45) Sep 1945. 54 p. Price: Microfilm - $1.00 - Photostat - $4.00
The German War Department made extensive use of the services of psychologists in the selection of officer personnel and in the selection of individuals to serve as specialists. Psychologists were widely used in industrial organizations for the selection and placement of personnel. This report presents information regarding the tests and techniques employed during the war at the Rheinmetall-Borsig plant by Dr. J. B. Rieffert, chief psychologist. The tests are described briefly. The major portion of the report is the appendix consists of a brief report by Dr. Riefert, chief psychologist. The tests are described briefly. The major portion of the report is the appendix consisting of a brief report by Dr. Rieffert on his testing program, accompanied by the tests used. These include: Directions test; reading comprehension test; analogies test; clerical proof reading test; spatial relations test; test of planning ability; mechanical insight tests; two hand steadiness test. An individual report card for test and foreman's rating card for tests are also included. These and the tests are given in German as well as in translation.

PB 20285. SNIDECOR, JOHN C. and FAIRBANKS, GRANT. The selection of telephone talkers: A manual for the training of interviewers, memorandum 2. (OSRD Rept 1827; NDRC Applied Psychology Panel Rept 34). n.d. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
This manual was prepared under contract of The Psychological Corporation with the National Defense Research Committee. It was used in the training of classification petty officers to give the speech interview, and served to supply background materials for a two weeks' program of which two hours per day were scheduled for training in the selection of telephone talkers. Sample blank rating sheets are included.

PB 22691. U. S. WAR DEPARTMENT. Instructions for preparation of Army extension courses. (Tech Manual 20-400) Apr 10, 1946. 35 p. Price: Microfilm - 50¢ - Photostat - $3.00
This manual is concerned with the routines to be followed in planning and preparing extension course material for officers who wish additional training. Appendices present examples of introduction and lesson and of lesson assignment sheets, and sample solutions.

PHOTOGRAPHIC AND OPTICAL GOODS (INCLUDING PHOTOGRAPHIC PROCESSING)

PB 18212. AUWÄRTER, MAX. Die durchlässigkeitskurve von quarsglas in gebiet von 2000 - 45,000 AE. (The filtration curve of quartz glass in the range of 2000 - 45,000 AU). (ALSOS Mission Gerlach IV A3). Feb 1940. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This publication is a report by the author who is with the Heraeus Company at Hanau and contains an explanatory letter and two diagrams. The applied test methods are explained and the findings critically analysed. In German.

PB 23641. HULBURT, E. O. Report on approximate theory of low reflecting films. (Naval Res Lab Rept R-2403) Nov 1944. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
For the purpose of facilitating the design of low reflecting transparent films on glass, the optical theory is outlined

and the theoretical formulas are worked out to a second degree of approximation. Theoretical curves of the reflection are calculated for several cases of one and two films on glass for various thicknesses and refractive indices of the films and of the glass. There is a list of references. Curves are given in the appendix.

PB 4371. RAINES, ARNOLD. Pressure testing of optical instruments. (Frankford Arsenal Fire Control Eng Rept 954) Apr 1945. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This document reports an expression which has been derived for the rate of change of pressure in a closed vessel at high pressure containing a leaking optical instrument. This rate of change of pressure is independent of the volume of the instrument providing the volume of the vessel and the instrument are equal.

PB 22361. U. S. STRATEGIC BOMBING SURVEY. Optical and precision instrument industry report. (Rept 50) Oct 1945. 182 p. Price: Microfilm-$2.00 - Photostat-$13.00
This survey of optical and precision instrument manufacturing indicates that the German high command attached great importance to having an adequate supply of highest quality optical and precision instruments including gunsights of all types, range-finders, tank sights, periscopes, bomb sights, etc. Carl Zeiss had long dominated the industry both in production and development and in financial control. This company controlled over 50 percent of the industry's finished production. Through its ownership of the Schott glass works Zeiss controlled 90 percent of the production of optical glass. The industry was capable of exporting military products and producing some civilian goods all during the war, indicating it had more than enough capacity to supply the German military service. The optical and precision instrument industry was not affected appreciably either directly or indirectly by bombing until late 1944 and early 1945. The main plants of the Zeiss concern including its principal optical glass making subsidiary, the Schott glass works, were concentrated in the town of Jena. These plants were manufacturers of submarine periscopes, special bomb sights, large navy range finders, as well as important factors in the manufacture of other types of military optical instruments. The results of the attacks on the Jena plants demonstrated not only that the Zeiss manufacturing facilities at Jena were vulnerable to bombing but that large amounts of finished instruments and work in process in the plants could be destroyed. This report summarizes the development of the optical and precision industry in Germany before the war, discusses the Zeiss Foundation, including the Schott Glass Works, and the development of this organization, and mentions the smaller optical industries. Bombs struck in or near the area of the Zeiss plants in Jena on five occasions but major damage was suffered from only three raids. In the RAF raid of May 1943, 7.3% of the buildings were damaged. In the 8th AF raids of the 17th and 19th of March 1945, 20.5% of the floor space was damaged. There was also great damage from fire caused by bombs. At the Schott glass works the loss was comparatively slight. The bombs fell in open areas of the plant and only 17 percent of the built up area was either structurally or superficially damaged. The Ernst Leitz firm, Wetzlar, the second largest concern in the optical and precision industry, was hit by two raids in July 1944 and March 1945. The report is illustrated by photographs, an organization chart of Carl Zeiss, a map showing the location of the various plants in the industry, graphs of sales and employees, diagrams of targets, etc.

PB 22355. U. S. WAR DEPARTMENT. Projector AN/TFQ-4. (Tech Manual 11-2347). Jul 1945. 143 p. Price: Microfilm-$1.50 - Photostat-$10.00
Projector AN/TFQ-4 is designed to project 16-mm sound or silent motion picture film at speeds between 16 and 24 frames per second. It is intended for presentation of motion pictures to large audiences. The equipment consists of a projector mechanism, carbon arc lamphouse, rectifier, PA-3 amplifier, four speakers (2 horn-type and 2 cone-type), a projector stand, and necessary accessories. This instruction manual covers description, assembly and installation, operation maintenance, and repair. There are numerous photographs, drawings and diagrams.

PB 23422. U. S. WAR DEPARTMENT. Projector equipment PH-398. (Tech Manual 11-406) Apr 1945. 134 p. Available from the Supt Docs, Washington 25, D. C. 50¢
This Signal Corps projector equipment PH-398 for sound motion pictures was designed for educational purposes and has sufficient illumination and sound volume for any ordinary classroom or for auditoriums of moderate size. The power supply required for the projector is 105-124 volts a-c, 60 cycles, 900 watts and for the amplifier 105-125 volts a-c, 50-60 cycles, 180 watts. A general description and technical data regarding the component parts of this equipment are given, also information on functioning of these parts, installation, servicing and repairs, together with numerous photographs, drawings, schematic wiring diagrams, and lists of parts.

RUBBER AND RUBBER PRODUCTS

PB 27538. SWANN, SHERLOCK and ELIAS, M. M. The synthesis of acrylamides and the mixed polymerization of acrylamides and butadiene: Translation report. (This report is the same as PB 904, v. 1, p. 75, with the exception of added tables and graphs.) Oct 1945. 21 p. Price: Microfilm-$1.00 - Photostat-$2.00

STONE, CLAY, AND GLASS PRODUCTS

PB 22801. KELLER, ALLEN and HERBERGER, CHARLES. Turbine ceramic bucket and wheel development project at M.A.N. Plant, Augsburg, Germany. (Naval Tech Mission in Europe Tech Rept 166-45) Sep 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
The Maschinenfabrik Augsburg Nürnberg (M.A.N.) Company at Augsburg had started developmental work on the use of ceramics as a turbine bucket and wheel material for use in diesel engine superchargers. They hoped to develop, within a period of five years, a turbine bucket material suitable for operation at 1000° C. (bucket temperature) with bucket tip speeds up to 500 feet/sec. This development was in its early stages, and no turbine with buckets of this material has been operated. Photographs accompany the report.

PB 27685. SCHUTTA. Bericht über die in der M.A.N. durchgeführten arbeiten an keramische werkstoffen (Report on experiments with ceramic substances developed and tested by M.A.N.). Jul 1945. 17 p. Price: Microfilm - $1.00 - Photostat - $2.00
This report in German shows the experiments made with quartz glass, sinter alumina (Sintertonerde) and various kinds of porcelain for their utilization in the manufacturing of gas turbines performed at the Maschinenfabrik Augsburg-Nürnberg (M.A.N.). The tested material was mostly destroyed by air raids on February 25 and 26, 1944 on Augsburg. The theoretical results, however, and the tables and designs were saved and are included in this report.

STRUCTURAL ENGINEERING

PB 23197. WERNISCH, G. R. The Braunschweiger and Dyckerhoff systems of concrete reinforcement. (CIOS File XXX-82, Item 32) 1945. 21 p. Price: Microfilm-50¢ - Photostat-$2.00

German experience and tests have indicated that the Braunschweiger and Dyckerhoff systems of reinforcing concrete roofs, floors and walls are most effective in resisting explosive and blast damage. This report presents a general exposition of the fundamental theory involved in both systems, and traces the various types of systems tested and used in Germany before one system was generally accepted by the Luftfahrtministerium. The effect of bombs on plain and reinforced concrete slabs is compared and the effect is illustrated by diagrams and curves. Five different systems are described briefly followed by a more detailed discussion of the development of the Braunschweiger and Dyckerhoff systems. Diagrams and curves illustrate the two systems.

PB 22810. WERNISCH, G. R. Prestressed reinforced concrete trusses in submarine pens. (Naval Tech Mission in Europe Tech Rept 278-45) Sep 1945. 36 p.
Price: Microfilm-50¢ - Photostat-$3.00
Salient construction and design features of 92 feet clear span pre-stressed reinforced concrete roof trusses installed in Farge-Bremen submarine assembly pen are presented in this report. General design and construction data illustrated with photographs and drawings included. Some of the drawings will not reproduce clearly as the copies of them accompanying this report are very blurred.

PB 23083. WERNISCH, G. R. and ERIKSON, R. E. Structural welding practices in Germany. (U. S. Naval Tech Mission in Europe Tech Rept 512-45) Sep 1945. 9 p.
Price: Microfilm-50¢ - Photostat-$1.00
To obtain general information on welding practices, design, and electrodes, five different German firms were visited. The information received from these investigations is combined in the present report. Subjects covered are: Shop welding, electric arc welding, automatic welding, field welding, types of structures and framing in which welding was used, calculations of welded structures, and electrodes. It was found that structural welding was used much more extensively in Germany than in the United States and that structural welding procedures and controls and electric arc welding equipment were inferior to those in the United States. For dynamic, repeated loadings, only welded plate girders were used. Welded trusses were prohibited.

PB 18526. YORK, J. LOUIS. Vapor barriers, with annotated bibliography. (OFRD Res Rept, Project M-544)
Feb 1945. 35 p. Price: Limited free distribution; thereafter, microfilm-50¢ - photostat-$3.00
This report discusses vapor barriers and gives water-vapor transmission rates for various building materials. History of measurement methods is included. Salient features of the different test procedures are brought out in an annotated bibliography of 166 items. Tables are given.

TEXTILES AND TEXTILE PRODUCTS

German

PB 22948. ANDREWS, A. H., Jr. The German aviation exposure foam suit. (Naval Tech Mission in Europe Tech Rept 495-45) Sep 1945. 10 p. Price:
Microfilm-50¢ - Photostat-$1.00
An exposure foam suit developed for use by the German Air Force is described in this report. Tests conducted by the Germans indicated that it is effective in prolonging life expectancy of personnel immersed in extremely cold water. The suit is made of medium weight quilted material and includes a jacket, trousers, mittens and foot pads. Upon contact with the water, the chemical powder contained in each section of the quilted suit reacts with the water and releases a carbon dioxide foam. This gas forms a protective layer which reduces the rate of loss of body heat and thereby affords protection against extremely cold water. The description of these suits and of experiments in their use and formulas of gas producing chemical are given. Graphs of data are included.

PB 23638. CROSSLEY, M.L. and RICHARDSON, FRANCIS L. Screen printing. (QM Textile Series Rept 5) n.d.
17 p. Price: Microfilm-50¢ - Photostat-$2.00
This document contains two reports on the subject of screen printing: One prepared by Dr. M. L. Crossley, based on his observations and discussions with Sergeant H. H. Hiett and Mr. Klimsch, about the screen printing process used by Klimsch and Company, Frankfurt/Main; and an article prepared by Francis L. Richardson, based primarily upon interviews with Franz Nestleberger, textile printing engineer, at the Höchst plant of I.G. Farben. In the screen printing process used by Klimsch and Company the screen is fine copper filter cloth similar to that used to filter gasoline. It is coated with a water solution containing polyvinylchloride and ammonium bichromate. It is dried at about 35° C. The design to be impressed on the sensitized film is placed in contact with it and exposed to light for a short time. The light causes the bichromate to oxidize the polyvinylchloride to an insoluble film; the unexposed portion of the film dissolving off in water and leaving the design on the screen. This printing screen is inked and used to print the design. Excess printing ink can be removed by washing with water or benzine, depending on the nature of the printing ink used. Finally, when no further prints of the design are needed, the design is removed from the screen with potassium permanganate and sulfuric acid, the screen washed thoroughly with water and dried. It is then ready to be recoated for a new design. The article by Francis L. Richardson states that the new process for producing printing screens encountered at the Höchst plant of I. G. Farben makes practical the production of screens with considerably finer execution of detail than was previously possible. The screens produced in this manner are much more durable and less susceptible to chemical action and damage. This new method of producing printing screens utilizes a new type of lacquer, "Screen Lacquer N", made light-sensitive by the addition of bichromate, using "hardener NA", "screen blue N" and "covering lacquer N". "Screen lacquer N" is saponified polyvinyl acetate and is obtainable from chemical manufacturers. "Hardener NA" is a mixture of three parts of formaldehyde and one part of butylaldehyde. "Covering lacquer N" is beetle syrup - 50 percent urea formaldehyde, 25 percent xytol and 25 percent butanol. Originally a phenol resin was used, but the beetle syrup was found to give better results.

PB 20093. HEMSLEY, L. and others. The viscose continuous and rayon staple fibre plants of the British, American and French occupation zones of Germany. (BIOS Final Rept 290, Items 22, 31) Jan 1946. 342 p.
Price: Microfilm-$3.50 - Photostat-$23.00
The team which visited these factories went with the idea of assessing the value of any suitable plant likely to be seized as reparation in accordance with the Potsdam Agreement. The report is divided into four parts. Part one, a covering report of the trip, describes briefly the outstanding features of the following firms: Karl Zang, Krefeld; Rheinische Kunstseide Fab., Urdingen; Barmag Maschinen Fab., Lennep.; Kampf & Spindler-Hilden, Duesseldorf; Glanzstoff Courtaulds, Koeln; Rheinische Zellwolle, Siegburg; Kuehlne, Kopp & Kausch, Frankenthal; Hereaus Hannau, Frankfurt a Main; Vereinigte Glanzstoff Fab., Obernberg; Vereinigte Glanzstoff Fab., Kelsterbach; Gustav Eirich, Hardheim; I.G. F. Ludwigshaven, Oppau; Deutsche Waffen & Mun. Fab., Karlsruhe; Fritz Müller-Esslingen, Stuttgart; Zellwolle Lehr Spinnerei, Denkendorf; Werner Pfleiderer Feuerbach, Stuttgart; I.G. F. Bobbingen, Augsberg; Süddeutsche Zellwolle A.G., Kehlheim; Sartorius, Goettingen; and Spinnfaser A.G., Kassel. Part two of the report presents in tabular form the machinery earmarked as suitable for reparations from Germany giving

the estimated replacement value in pounds sterling. Part three presents similar data but includes machinery suggested as suitable for either reparations or prototypes from Germany. Part four presents a detailed technical report on every target visited. This part begins with a brief description of the latest shredding and mixing devices used in the viscose spinning industry in Germany followed by a discussion of each target which includes information on outstanding features of the plant, condition of the factory, capacity, production data, drawings of machines, flow sheets and sketches of processes as carried on in the plant.

PB 22802. JAYNE, J. M. The German emergency flying suit. (Naval Tech Mission in Europe Tech Rept 174-45) Aug 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
The suit is made of a medium weight quilted material, and the complete suit consists of: 1 jacket, 1 pair of trousers, 1 pair of mittens and 1 pair of foot pads. Upon contact with water, the chemical powder contained in each square of the quilted suit reacts with water and releases a gas believed to be CO_2. This gas forms a protective layer that tests by the Germans have indicated as being successful in containing the body heat of the wearer and thereby affording protection against extremely cold water. The tests indicated that the suit was effective for periods up to eight hours.

PB 14584. RIECHERS, KURT. Faserstoffe. (Fibers). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik II C 18). (Alsos Mission, Klotter File 11 B) Oct 1938. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
This report is one of a series published by the German air ministry. The report covers the results of tests upon fibers and cloth woven of the fibers, to determine their suitability for use in aircraft. Mechanical and physical tests such as tensile strength moisture absorption, etc., are described and test equipment illustrated. The fibers were mainly of plant origin, such as cotton, kapok, hemp, linen, etc. but silk, synthetic and mineral fiber were also included. Tables, graphs and photographs are included.

PB 27451. SCHIEFER, H. F. and KROPF, R. T. Report on German Research Institute for the Textile Industry at München-Gladbach-Rheydt. (For supplement, on microfilm, containing documents in German, see PB 27452). n. d. 5 p. Price: Microfilm-$1.00 - Photostat-$1.00
This report includes summaries in English of important publications from the Textile Institute at München-Gladbach-Rheydt. The publications include doctoral dissentations and should be of particular interest to textile schools in this country. The publications are: (1) Retention of the cellulose molecular structure in staple fiber manufacture by Dr. Otto Mecheels (Director of the School of Technology at Aachen) and Gerhard Dierkes. 1937. 34p; (2) Research on alkali aging or ripening of wood cellulose, by Otto Mecheels and Hubert Werning. 1938, 32 p; (3) Effects of chemicals on wool and quantitative methods for the determination of damage to wool, by Otto Mecheels and Erich Feller. 1939, 56 p; (4) Technical and scientific work for the clothing industry. 1940. 62 p. (This series contains articles on (a) shrink proofing of clothing by P. Hoff; (b) Selvedges for fabrics by O. Mecheels; (c) A study of assembly line methods in the manufacture of men's outer wear clothing by E. Donner; (d) Thermal insulation of clothing by O. Mecheels, (e) Cutting uniform coats from full width fabrics vs half width of doubled fabric by Schleypen; (f) A cost study in steam pressing plants by E. Donner; (g) Lighting, heating and ventilating in clothing factories.); (5) Technological investigations and time studies for the production of army overcoats by E. Donner. 1941, 84 p.; (6) Fish-protein in nutrition and clothing. Part I by P.P. Hiltner on the ocean as a source of raw material; part II by O. Mecheels on fish-protein animal-like fiber. 1939, 27p; (7) Fish protein animal-like staple fiber "Wikilan" by O. Mecheels and K.A. Essig, 1940. 58 p; (8) Textile finishing, by O. Mecheels. 1940, 380 p. (A textbook on finishing procedures, testing methods, and instructions for experimental work); (9) Testing instruments for the textile industry, by W. Oeser. 1940, 160 p; (10) Results of scientific investigations by Otto Mecheels, 8 p. (Manuscript) Eleven abstracts covering the following subjects: (a) Mercerization of cotton, (b) Measurement of softness, (c) Water-repellent finishes (d) Moth-proofing of wool with Eulan, (e) Bleaching, (f) Measurement of resistance to wear, (g) Textile finishing agents, (h) Fibers from fish-protein, (i) Effect of finishes on durability of textiles, (k) Functional studies of clothing, (l) Work clothing. These publications, including the manuscript point, written in German, have been deposited in the Library of the National Bureau of Standards, Washington, D.C. where they can be consulted, and are reproduced in full in PB 27452.

PB 27452. SCHIEFER, H. F. and KROPF, R. T. Report on German Research Institute for the Textile Industry at München-Gladbach-Rheydt. Supplement, documents in German (35 mm microfilm). (For original report see PB 27451). n. d. 222 p. Price: Microfilm-$5.00 - Photostat-$22.25
This microfilm contains the copies of the original German documents noted and summarized in the English report by Herbert F. Schiefer and Richard T. Kropf on German Research Institute for the Textile Industry at München-Gladbach-Rheydt (PB 27451).

PB 22690. SMITH, JULIAN F. Textile research and testing at Krefeld. (FIAT Final Rept 331) Oct 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
This report is the final compilation of the interrogation on Sep 18, 1945, of Dr. W. Weltzien and Dr. F. Rost of the Textilforschungsanstalt Krefeld (Textile Research Institute, Krefeld) and its testing division (the Öffentliche Prüfstelle für die Spinnstoffwirtschaft--the Public Testing Station for the Fiber Industry). These agencies supported by and worked only for the industry. Studies were made of swelling behavior, abrasion, tensile properties of fibers and other physical properties of fibers, yarns and fabrics.

United States

PB 23129. EDELMAN, NORMAN B. Determination of statistical control and related factors in the performance of breaking strength testing of fabrics. n. d. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
The present paper is based on a study conducted at the Philadelphia Quartermaster Depot designed to illustrate statistical control in breaking strength testing of textile fabrics performed in accordance with federal specification CCC-T-191a. The survey was intended to demonstrate whether: (1) Any person having had some experience in performing "breaks" should be permitted to perform these tests when occasion arises or whether performance of tensile strength tests is a highly specialized technique for which only a select group is elibile; (2) there is justification in the belief that "jaw breaks" are invalid and should be deleted from evaluations of the strength of a fabric; (3) the number of "jaw breaks" obtained can be used to evaluate the skill of an operator; (4) the kind of breaks, i.e., excellent, good or fair, as defined in the report, is related to the skill of the operator. Procedures and findings of tests are described. It was found that: (1) Those subjects whose tensile testing was out of control had not met both the criteria of considerable experience and continual performance in textile testing; (2) jaw breaks which constitute about 1/3 of all the breaks performed are shown to give more variable strengths and definitely lower average strengths than acceptable breaks, indicating that the jaws of the test machine contribute a weakening effect on the fabric and that jaw pressures should be known and regulated; good operators get practically the same number of jaw breaks as those out of control. Tables of data and statistical control charts are included.

PB 20648. GODDARD, WILLIAM L. and VAN DILLA, MARVIN. Thermal transmission of fabrics: Review of pertinent literature. (QM Corps Climatic Res Lab Rept 45-89-A) Jan 1946. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
Several factors influence the thermal insulation properties of fabrics. Most important is fabric thickness. Other factors include mean density, yarn characteristics and weave, fiber alignment, method of application to the body to be insulated, ambient air movement and presence of liquid water within the fabric. The apparatus used for measuring the thermal transmission of textiles usually incorporated the guard ring principle in both cylinders and flat plates. Results were expressed in various arbitrary units which are not readily compared to the present widely used clo unit. Furthermore, the description of the fabrics tested was usually unsatisfactory so that the results cannot be compared with exactness. In many instances the method of accounting for the air film resistance was not apparent. A chronological summary of the results of the work of the past fifteen years, during which most of the research pertinent to textiles and clothing was done, is presented in Appendix I with footnote references to the literature on this problem.

PB 20650. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. The Quartermaster Board wet course. (Project M-54) Feb 1944. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
A description of a proposed course for determining the resistance to penetration of moisture of various types of finishes, fabrics, and garments is given in this report. Such a course was desired to provide a controlled method of testing the water resistance and repellency of these materials. The tentative plans for this wet course specified a pentagon-shaped track approximately 285 feet long. Rainfall would be simulated by a system of overhead pipes and side pipes. It was proposed that test subjects, constantly subjected to varying degrees of rain, ranging from a light mist of a driving rain storm, would traverse the track, encountering numerous obstacles designed to subject the fabric to wet conditions actually found in the field. A detailed description of the proposed wet course is given.

TRANSPORTATION EQUIPMENT

AERONAUTICS

Aircraft

German

PB 23094. BIOT, M. A. High speed research at AVA Goettingen. (U.S. Naval Tech Mission in Europe Tech Rept 537-45). Oct 1945. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
This is a review of the work of the Department of High Speed Problems of the Aerodynamische Versuchsanstalt (AVA) at Goettingen. Fields of investigation include ballistics, compressibility effects in aerodynamics, and ship propellers. Work at this location is described in a translation of a report by Prof. Walchner, director, and Dr. Ludwig, deputy director, included in this paper. Research summarized includes (1) development of propellers for high speed surface ships (2) development of technique and tunnel design for high speed wind tunnel testing (3) systematic research in the ballistics of projectiles by wind tunnel testing (4) efficient design of muzzle brakes to decrease gun recoil (5) boundary layer control at high speeds (6) determination of optimum jet engine inlets (7) testing of swept back wings at high speeds.

PB 25153. BOCK, GUENTER. New trends in German aircraft construction. (BIOS Halstead Exploiting Centre Rept 18). 1946. 45 p. Price: Microfilm-50¢ - Photostat-$3.00
This publication of the German Academy of Aeronautical Research gives a retrospective review of German design and an account of emerging types of aircraft now in course of development. New types of construction, to reduce drag area, trend toward the cantilever monoplane with tail unit, which may be low-wing, midwing, high-wing or semi-high-wing, or toward the tailless, high wing load type of Lippisch. The introduction of jet propulsion and its influence on design is expressed in the Messerschmitt fighter Me-262, the combat performance of which is outlined. The Arado single-seater long range reconnaissance jet propelled plane Ar-234 and the development of a bomber type is described in comparison with the Mosquito XVI design, and design and test flight data are given. The Junkers design Ju-287 is described with design and test data given. The German text with numerous photographs, graphs, charts, tables, and other design data is interpersed throughout the translation.

PB 23098. CALDWELL, F. W. and SHOEMAKER, J. M. Aerodynamic and power plant research and facilities at Luftfahrt Forschungs Anstalt (LFA) Braunschweig and Aerodynamische Versuchs Anstalt (AVA) Goettingen. (U. S. Naval Tech Mission in Europe Tech Rept 502-45). Sep 1945. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
Investigation of these plants indicated that the equipment on hand and under construction at these institutions and the work in progress at the time of the German defeat was of the highest order. Prof. Schmidt at the power plant research laboratory was working on gas turbines and had developed several unusual features. One of these was the use of ceramic stator blades. Several ceramics had been tried, including magnesium silicate, magnesium oxide, aluminum oxide and carborundum. In Schmidt's opinion, the most promising for aircraft power plants is the carborundum, with an enamel coating to prevent erosion and oxidation of the carborundum. Brief notes are given on LFA power plant research at Braunschweig including engine and turbine research. Wind tunnels at Goettingen were examined and information was secured relative to tunnels at an abandoned potash plant at Reyershausen. A nearly completed laboratory for axial flow compressor and cascade investigations was inspected. References on theoretical cascade studies are listed.

PB 23543. CHARLINS, ARNOLD, tr. Theories about tailless airplanes; edited by Robert Patek. (AAF ATSC T-2 Translation 516). Mar 1946. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
These unsigned comments on a discourse by Dr. Kramer on the theories and devlopments of the tailless airplane are a translation of the German "Theorien an schwanzlosen flugzeug". The three problems of the design of these planes are: (1) Establishing stability around the vertical axis, (2) dynamic stability around the lateral axis at various positions of the center of gravity, and (3) arrangement of the undercarriage to assure good take-off and landing performance. Design data as a result of experiences with rudders, wings, pusher propeller drives, fuselage design, landing gears and testing of aerodynamics of design features are given.

PB 23103. EISENBERG, P. Facilities, instrumentation, and methods of the Hamburgische Schiffbau Versuchsanstalt. (U.S. Naval Tech Mission in Europe Tech Rept 543-45). Sep 1945. 191 p. Price: Microfilm-$2.00 - Photostat-$13.00
This comprehensive study describes research conducted at this model basin on the structural testing of full sized aircraft and aircraft parts by towing through the water to destruction with the progress of failure noted. The merits and demerits of testing of aircraft in water are examined. The construction of new facilities, and the development and measurement of performance of equipment for testing make up most of the report. Development of dynamometers and other instruments, of covering plates to reduce surface waves, and cameras and other means of underwater observation are covered. Instruments and methods for torpedo research, and model tests of small submarines were being prepared, and instruments were being developed for tests on ship models for pressure resist-

ance and propulsion methods. Much of this work is pertinent to American research methods. The text is fully illustrated with photographs, plan drawings, and diagrams and also contains tables and schematics.

PB 20308. GOTHERT, RUDOLF. Höhenleitwerksmessungen. (Stabilizer-elevator measurements). (Reichaluftfahrtministerium, Ringbuch der Luftfahrttechnik, I A 13). May 1940. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
This is one of a series of technical papers published by the German Air Ministry. The author reviews previous calculations made of isolated horizontal stabilizers and elevators. These are examined mathematically. The rudder-assembly is likewise studied. The report contains graphs, drawings, and a bibliography.

PB 25654. HOTSON, A. W. Dornier structural strength test equipment and methods. (BIOS Final Rept 66, Item 25). Jul 1945. 15 p. Price: Microfilm-$1.00 - Photostat-$1.00
This report describes the methods and equipment used at the Dornier structural laboratory, located at Wasserburg near Friedrichshafen, for testing the strength of the D.O.335 complete airframe. The test gear was completely mechanized and centrally controlled and had many interesting features which are discussed, and photographs of which are shown in the report. Test conditions and procedure are given and test specimens and frames are described. In designing the loading gear Dornier's had aimed to provide for remote control, by a single operator, of up to 24 dynamometer-straining units of different sizes. These units were not all equally loaded although there was duplication of the port loading on the starboard side. The control unit, after its initial adjustment for any particular test, should synchronise the various straining units so that each portion of the specimen received its correct proportion of load in step with all other parts of the specimen. The control scheme was complicated but was very largely successful. An autographic load-deflection recorder, shown in a drawing (which will not reproduce well), seems to have been still in the scheme stage since it was not in use on the test. No strain gages of any sort had been fitted to the test specimen at the time of the visit. It seems that Dornier's relied on mechanical gages of the Huggenburger type, and that they had no electrical strain gages. Since the M.A.P. party was due to leave the Friedrichshafen area before the date of the airframe test, the French authorities were requested to send a copy of the test report, when available, to the Royal Aircraft Establishment, Farnborough.

PB 23099. JAYNE, J. M. Comments on the German aeronautical research program. (U.S. Naval Tech Mission in Europe Tech Rept 501-45). Sep 1945. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
This report describes the highlights of the German aeronautical research program and some of its more noteworthy attributes. It is not intended to make this a comprehensive analysis of German research but rather is desired to point out certain facts which might influence American thinking along similar lines. German research as covered in this report deals only with the period from the inception of an idea to the completion of the first prototype. The "Forschungsführung", an organization created in 1943 for the coordination of aeronautical research, is described in some detail. A chart of its organization shows the lines of responsibility for research activity. The following are the major research institutions in Germany during the period: Deutsche Versuchsanstalt für Luftfahrt, Adlershof, Berlin; Luftfahrt Forschungsanstalt Hermann Goering, Braunschweig; Aerodynamische Versuchsanstalt, Goettingen; Deutsche Forschungsanstalt für Segelflug, Ainring; Forschungsanstalt Graf Zeppelin, Stuttgart-Ruit; Wasserbau Versuchsanstalt, Kochel; and Luftfahrt Forschungsanstalt, Munich. The outstanding feature of policy carried out by Forschungsführung was stimulating of competition among research organizations. Graphs show the money appropriated for research from 1935 to 1945 and the persons engaged in research from 1930 to 1945. Research projects under each institute are given. A list of wind tunnels in operation in Germany in 1945 appears in an appendix.

PB 23742. LAWRENCE, LOWELL. General survey of rocket motor developments in Germany. (CIOS File XXXII-110, Item 4). Aug 1945. 92 p. Price: Microfilm-$1.00 - Photostat-$7.00
This report contains a survey of the rocket fuels and rocket power plants developed by the German government for use in rocket missiles, aircraft prime movers and jet-assisted take-off devices. Characteristics of the important motor systems are outlined in detail. A historical survey and a list of research institutes and companies engaged in rocket development is followed by a section on fuels of interest to American rocket research. Jet assisted take-off (JATO), aircraft rocket power plants for the Wasserfall anti-aircraft rocket, a projected long range artillery rocket and for other guided missiles, and miscellaneous jet power plant systems are taken up. American study of Visol and Tonka fuels, powder squib pressuring valves and frangible disc propellant valves and other power plant development, is recommended. Photographs, tables, charts, diagrams and a list of microfilm pertaining to rockets and guided missiles are included.

PB 25148. LIPPISCH, ALEXANDER. The evolution of tailless planes. (BIOS Halstead Exploiting Centre Rept 7) Nov 1942. 87 p. Price: Microfilm-$1.00 Photostat-$6.00
This report is a translation of a lecture given at the ninth scientific meeting of the German Academy for Aeronautical Research, held on November 6, 1942. Lippisch outlines the evolution of tailless planes from flying models high-powered airplane, and reviews earlier conclusions of his on measurements and profiles on airplane wings and early tunnel testing. Flight tests of the first tailless powered aircraft took place in September 1929. The design of wing forms for all-wing aircraft based originally on NACA measurements, resulted in the design of the Delta I low wing 2-seater with pusher propeller. Design changes which resulted in the Delta V are outlined. A high speed, jet propelled, aerodynamically advanced Delta IV was test flown in 1941. Airflow measurements in relation to aerodynamic design are discussed, including some investigation of straight vs. sweptback wings at high Mach numbers. Discussion at the end of his lecture brings out points of view on modern design by several German manufacturers. The German text, with many illustrations, photographs and design drawings is appended.

PB 23549. NAUMER. Comparison of the 8-229 and the GO P-60 all-wing airplanes. (AAF ATSC T-2 Translation 525). Feb 1946. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
A comparison is presented of the most important structural and aerodynamic properties of these two planes which are planned for service as heavy pursuit ships or as reconnaissance planes for close or medium range sorties. Tables of comparative data on the general structure of the two planes are followed by a review of the flight performance and flight characteristics of both, with some suggestions for future aerodynamic changes. A chart giving a comparison of the performance, weight, and size of the GO 8-229 and GO P-60 all-wing airplanes, profile drawings and a graph are included. This is a translation of a German report "Gegenüberstellung 8-229/GO P-60 prepared at Gothaer Waggonfabrik, A.G. Flugzeugbau-Entwicklung."

PB 23541. PABST. The performance values of Lorin (ram jet) engines with full ramming of air. (AAF ATSC T-2 Translation 514). Feb 1946. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
Power coefficients and power of cross section areas are calculated and plotted in graphs for various stresses and flight speeds. It is apparent that power units exceeding 104 h.p. can easily be obtained. Previously attained efficiences are again presented in slightly altered form. Results of previous investigations are summarized and some discussion of the calculations is given in this translation of the German report, "Die leistungsgrösse von Lorin-motoren mit vollständigen luftaufstau".

PB 23561. PATEK, ROBERT, tr. Description of the project P 01-114 under construction. (AAF ATSC T-2 Translation 540). Mar 1945. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
The P 01-114 airplane is a tailless single-seater, mid-wing monoplane, jet propelled with pressurized cockpit and jetison landing gear. It is planned to serve as a test model to test the construction at very high speeds and high climb performance in comparison with the Models P 01-112 and P 01-113. The wing unit of the test plane is the same as that planned for the heavy models with armament. The wings are designed in such a way that it is possible to change the center of gravity while in flight by shifting the wings. The fuselage of the new model is simpler than that of earlier models to speed up production. The HWK power plant can be advanced gradually to very high speeds. A description is given of the airframe, the power plant and the equipment and their component parts. Profile drawings and curves of performance calculated values are given in this translation of the German document "Projektbaubeschreibung P 01-114".

PB 23548. PELLIEUX, EDMOND C., tr. The Lorin duct as aircraft propelling force; edited by Brigitta Kuhn. (AAF ATSC T-2 Translation 523). Mar 1946. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
This report from Focke-Wulf Aircraft Construction Co., Bremen, discusses the development of the Lorin nozzle by the Walter Firm and a secret Focke-Wulf design for a combustion burner that reduces fuel consumption. Additional design data is given, leading to the development of an athodyd-propelled low wing monoplane with strongly swept-back wings and tricycle landing gear. The slim fuselage of monocoque construction contains a pressurized cabin for the pilot, with armament in the front. Behind the pilot's seat are tanks for T-fuel and C-fuel for use in the Walter thruster in the fuselage tail. The Walter thruster takes off and lands the plane vertically, and gives it excellent climbing power for high altitude operation. Construction Description no. 283 also included gives basic considerations on aircraft propulsion by means of duct engines (athodyds) and describes its construction, including balance control surfaces, wing construction and athodyd unit construction. Tables of characteristics and presumed flying performance, with graphs and profiles are given. Translation from the German.

PB 22938. SCHLIESTETT, G. V. Junkers spring tabs. (Naval Tech Mission in Europe Tech Rept 430-45). Sep 1945. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This report by Dip. Ing. E. Zindel, chief designer of Junkers, on Servo tabs with Junkers spring control was written at the request of Mr. L. E. Root during the interrogation of Junkers engineers. It has been freely translated by Lt. L. P. Halston because of the irregular composition of the original. The servo tab is directly controlled by the pilot, but the kinematically retarded servo action starts after a tension spring between the push-pull rods and the control surfaces is overcome by excess pressure. The disadvantages of this system as well as the advantages of its use in elevators, ailerons, and combined elevator-ailerons of a tailless airplane are discussed. Specific data from flutter calculations, ground vibration tests and high speed wind tunnel tests not now available are needed. Design drawings are given.

PB 23542. SCHMERLER, JULIUS, tr. Test stand experiments on vibrations with the all-wing airplane model DFS 39; edited by Robert Patek. (AAF ATSC T-2 Translation 515). Mar 1946. 29 p. Price: Microfilm-50¢ - Photostat-$2.00
Airplane model DFS-39 is a cantilever tailless low-wing monoplane with a Pobjoy R engine of 75 h.p. A full description is given of the wing design which includes slats and removable vertical end plates. The airplane was suspended on a soft rubber shock absorber from the spar midsection. A Loschhausen vibrator capable of both symmetrical and asymmetrical excitation was used to start vibration excitation. Six series of tests were made at loose control stick, fixed control stick, and slack control cables. Test results are described and shown graphically. The critical speed, as derived from the recorded resonance curves and types of vibration, is estimated at 335 km/hr. Test flights were in agreement with this as no flutter phenomena of any kind could be detected up to speeds of 300 km/hr. This report is a translation from the German article, "Standschwingungsversuche mit dem nurflügelflugzeugmuster DFS 39".

PB 23564. SPIEGELMAN, REGINA, tr. The Fiat land airplane catapult Kl 12; edited by Emilia Wilder. (AAF ATSC T-2 Translation 548). Apr 1946. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
This report is intended to accompany a film of a mobile take-off assisted by the FIST (Flugtechnisches Institut Stuttgart) land airplane catapult Kl 12. This device starts heavily loaded airplanes from soft ground or on short runway. The catapult consists of a main unit, which accelerates the plane by means of an acceleration cable fastened to a hook on the bottom of the fuselage, and an auxiliary unit, 250 meter away from the main unit, which holds the acceleration cable and disengages it from the plane at the end of the run. Energy is supplied by means of a storage drum, a front drum and a 320 hp. Otto engine. The report gives the mode of operation of the catapult, and the operation of the main unit in take-off procedure. The fastest take-off succession is 7 minutes. With the catapult, airplanes up to 14 ton gross weight and having a take-off speed of an even 220 km/hr are started on a 100 m. take-off run. With a smaller take-off speed, the gross weight can be increased. The spoken text to the film is included in this translation from the German "Die FIST - Landflugzeugschleuder Kl 12".

PB 23345. U. S. STRATEGIC BOMBING SURVEY. Messerschmitt A.G., Augsburg. Vols. I-IV. (Rept 11; Air Frames Plant Rept 6). Oct 1945. 313 p. Price: Microfilm-$3.50 - Photostat-$21.00
This report, in four volumes, consists of the following: An overall report; Part A, "Plant analysis on Augsburg properties; Part B, "Plant analysis on Messerschmitt G.m.b.H., Regensburg; and three appendices consisting of a report on Horgau Forest dispersal, a report on Kematen, Austria, underground dispersal, and a report on Messerschmitt Me-262. Plant surveys were made June 1-10, 1945. Messerschmitt A.G., through wholly owned subsidiaries and licenses, represented one of the largest aircraft manufacturing enterprises in Germany. More than 50 of all aircraft exports during 1944 and about 90% of that country's aircraft exports during the years 1942-44 were attributed to Messerschmitt. The parent company, with headquarters at Augsburg, operated an extensive aircraft complex of its own in addition to exercising almost complete ownership of Messerschmitt G.m.b.H. which in itself developed into a major aircraft producer surrounded by many satellite properties. Extensive use of dispersal sites was employed. The Augsburg complex had 31 production and 18 storage sites widely dispersed. The leading installations in this group were the Leonburg Tunnel, Horgau Forest and Kematen underground units. Regensburg also resorted to wide-spread use of dispersal plants, and claimed 14 locations in this respect. Wiener Neustädter Flugzeugwerke A.G. and Erla Maschinenwerke G.m.b.H., although not financially controlled in any manner by Messerschmitt, were licensed by that firm and contributed a substantial share of the overall Messerschmitt plane production program. The principal plants of the complexes fitting into the Messerschmitt structure were widely diffused. The period required to recuperate from the first bombing attacks was considerably longer than that following subsequent attacks; approximately six to twenty weeks, as against an average of one to five weeks in the later period. Machine tool workshops were extremely vulnerable to air attacks because of the great number of machines contained in them. The resultant repair and replacement involved a long delay. The Augsburg plant, the nucleus of the Messerschmitt organization was located at Augsburg-Haunstetten, adjoining the Augsburg air field. This plant was engaged in two different phases of work, the development and the production of Messerschmitt aircraft and aircraft components. The research and design departments were moved to Oberammergau in October 1943 as a precaution against air attacks after the August raid on Regensburg. The Augsburg works were attacked five times, once by the 15th Air Force and four times by the 8th

Air Force. Numerous raids were made on subsidiary and dispersed sights. The plant processes most vulnerable to attack were the machine tool shops, jig and tool manufacturing, and other machine processes. Due to the general shortage of machine equipment, and the difficulty of repairing the machines and their specialized installations, destruction of these shops would have had the most crippling effect on production. Messerschmitt G.m.b.H., Regensburg, was formed in July 1936 and production began in 1938. Prior to the first heavy attack in August 1943 the Regensburg works consisted of two plants, at Prufening and Obertraubling. Dispersal was made to 14 different sites which lay within a radius of 155 miles of Regensburg. Only three of the Regensburg plants were heavily attacked. In August 1943 33 B-17's of the 8th Air Force dropped 82 tons of high explosive and incendiary bombs on the Prufening plant. In February 1944 234 bombers of the 8th Air Force dropped 81 tons of incendiary bombs on the Prufening plant. In July 1944 90 B-17's of the 8th Air Force dropped 233 tons of high explosives and incendiary bombs on the Obertraubling plant and 44 B-17's dropped 106 tons of high explosives and incendiary bombs on the Prufening plant. However, in spite of severe bombing attacks production was continued, largely at the forest and underground dispersal sites, such as Horgau and Kematen. Horgau was a forest dispersal plant of the Augsburg complex located about eight miles west of Augsburg, alongside the Augsburg-Ulm highway. The plant comprised 21 low wooden, barrack-like structures hidden in a dense pine woods and not visible from the air or the adjoining road. This plant produced 250 wings per month. The Messerschmitt works at Kematen consisted of two plants - a conventional type surface factory and an underground works installed in tunnels dug into the side of a mountain. These plants, which made components for Messerschmitt aircraft, were not producers of first importance and were not attacked. However, the underground portion of the works, which was about 80% completed and operative at the end of the war, is of special interest in providing an example of the projected German attempt to recentralize aircraft production while at the same time rendering it less vulnerable to air attack. The Me-109, single-engined fighter, Me-110, Me-410, twin-engined fighters, and the jet-propelled Me-262 fighter-bomber, were the principal planes produced. Other models included the Me-108 trainer, the Me-321 glider transport and its powered version, the six engined Me-323 transport, used in the African campaign. Also the Me-163 rocket jet fighter and the Me-264 four-engined long range bomber were built in limited quantities. The Me-262, turbo-jet aircraft, was perhaps the fastest operational aircraft in the skies in 1944 and 1945. Although its potentialities were belatedly recognized by the German high command it was in this aircraft that they finally placed their hopes of re-establishing air equality on the Eatern Front. It may not be an exaggeration to say that the Germans might even have regained their air superiority with this extremely fast aircraft had they been able to establish a force of 800 Me-262's by midsummer 1944. Photographs, plans, charts, tables, and graphs illustrate this report.

PB 23080. VERVILLE, ALFRED V. Report on Dornier pursuit plane development program. (U.S. Naval Tech Mission in Europe Tech Rept 534-45). Oct 1945. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This report represents a brief illustrated digest of Dornier pursuit plane developments and design studies obtained in interviews with Dr. Claude Dornier, his son and engineers while they were in protective custody in France. Airplanes discussed are Do-335 pursuit plane with tandem reciprocating power plant combination, Do-435 with tandem reciprocating and jet power plant combination, and a projected single seater with single rear pusher engine/propeller combination; a twin tandem engine/propeller all purpose pursuit plane, and a multiple jet pursuit plane of the Canard tail-first type, using swept back wings and tail surfaces. The text contains diagrammatic drawings of planes mentioned, and four curves.

PB 22633. VOGT, RICHARD. Bloha and Voss method of servo control for large aircraft. (BIOS Halstead Exploiting Centre Rept 11) n. d. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
In a talk on the designing of the control system for the Bloha and Voss BV-22 large flying boat, the aerodynamic and kinematic problems of the relationship of size to design are stated. The aerodynamical control surface balance was chosen for aileron steering. The pilot must have the feel of control in his handling of the plane, yet hand force is too small without the use of a spring for thrust. He provides additional elevator control by a gyroscopic installation using rotating spindles rather than push and pull rods. The elevator is separated, giving 40 per cent of the control to the automatic stabilizer and the rest is handled by the pilot's controls. Drawings and design data and aerodynamic data are included in this translation from the German.

PB 25151. ZOBEL, THEODOR. High speed wind tunnel of the Hermann Goering Aeronautical Research Station. (BIOS Halstead Exploiting Centre Rept 13). 1943. 87 p. Price: Microfilm-$1.00 - Photostat-$6.00
This paper, read to the German Academy for Aeronautical Research, describes in detail the construction and equipment of the high speed wind tunnel, giving the technical structure, characteristics of the airflow, and measuring apparatus and procedure, which includes the 3-component balance, piezo-electrical power measuring, optical measurements in general and the evaluation of the interference photos. Measuring techniques and equipment worked out here make this plant valuable for both basic research on experimental problems and testing requirements of the aircraft industry. Photographs, plans, curves, graphs, diagrams and other design data are appended. Translated by W. Zippel.

Japanese

PB 22519. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77); Metallurgical and chemical examination of a Japanese landing gear and wheel. Progress report 88, Jun 29, 1944. (OSRD Rept 4001; War Metallurgy Committee Rept M-347). Aug 1944. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
A wide variety of metal alloys and fabrication methods were used in producing this equipment. Of a total of 123 representative parts, 56% were steel, 20% aluminum, 14% copper-base alloys, 5% synthetic or plastic materials, 3% magnesium, and 2% zinc. Forging was used to good advantage, resulting in higher physical properties and a reduction in machining operations. Deep drawing, casting, and stamping operations are indicative of a balanced aircraft manufacturing system in Japan. Proper heat treatment was employed except in the ball bearing races. Scrap formed a considerable part of the furnace charges with molybdenum at higher than residual levels, and, in most cases, the steels were silicon killed, but with aluminum additions. An excellent synthetic rubber packing, which does not swell on contact with oil, was used for the shock absorber system. This appears to be similar to the new polyester type of synthetic rubber. Other plastic parts were of ordinary vulcanized fiber or vulcanized natural rubber. The oleo-resinous varnish which has been used on many aircraft parts was an excellent surface coating with good adhesion and good resistance to solvents or alkali: it appeared to contain a modified phenolic resin. Tables and photographs are included.

PB 22535. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77); Metallurgical examination of airframe sections from "Zeke", "Val", "Lily", and "Dinah" Japanese planes. Progress report 113, Aug 10, 1944. (OSRD Rept 4179; War Metallurgy Committee Rept M-377). Sep 1944. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
All but one of the aluminum alloys examined fell into the range of the duralumin alloys 17S and 24S, with the majority of the parts covered with an alloy cladding material. The one exception was the use of the X76S type in one spar and rib compression member from "Zeke". The use of aluminum-zinc alloys has been known for some time, but the low-corrosion and stress-corrosion resistances have been a handicap

to their application. Alloy-cladding material in place of commercially pure aluminum cladding has been extensively used by the Germans and Japanese, and to some degree in the United States. The corrosion resistance would be about the same as a 2S aluminum cladding. The clad coats examined in this report showed excessive diffusion of copper from the base metal, a condition which would lower the corrosion resistance almost to that of the duralumin base metal. The physical tests placed the alloys in the "T" temper or aged condition. The zinc alloys had tensile strengths in the neighborhood of 80,000 psi, although some cases of tensile strengths of over 100,000 psi have been found with variations of this type alloy. The rivets were formed from a 17S type aluminum alloy. All of the paint films had a modified phenolic-resin varnish vehicle. The pigments were either iron oxide or iron oxide and an organic dye. One instance of a zinc oxide pigment was found. The coatings with the green organic dye lacked the flexibility and adherence of the usual blue dye, prussian blue coatings. Tables, photographs and drawing are included.

PB 22517. REICHELDERFER, C. A. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of fuel tank from Japanese aircraft "Oscar". Progress report 85, Jun 24, 1944. (OSRD Rept 3999; War Metallurgy Committee Rept M-344). Aug 1944. 9 p. Price: Microfilm-50¢ - Photostat-$1.00

This tank, examined at Battelle Memorial Institute, was constructed of aluminum sheet, aluminum extrusions, brass, and steel fittings, assembled by riveting and welding. The sheeting and rivets were made from alloys similar to U.S. 2S, but contained higher amounts of impurities indicating the use of mixed scrap in the melting charge. Other aluminum parts were made from 24S, 2S and 31S. Fittings were made from alpha brass bar stock, forged or pressed Muntz metal, and steel. Discussion of the economic considerations involved in manufacture and of the aluminum-base and other alloys and of the protective coating, which was a modified phenolic-resin varnish pigmented with iron blue, are included. A photograph of this fuel tank and tabulated data accompany the report.

PB 22524. REICHELDERFER, C. A. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of landing gear strut, landing wheel, and tail wheel strut assembly from Japanese aircraft "Betty". Progress report 92, Jul 24, 1944. (OSRD Rept 4073; War Metallurgy Committee Rept M-357). Aug 1944. 34 p. Price: Microfilm-50¢ - Photostat-$3.00

Examination of the parts of the landing gear strut, landing wheel, and tail wheel strut assemblies revealed no unusual alloys or fabrication methods. Magnesium castings were made from an alloy similar to Dowmetal H. Aluminum alloys were similar to Alcoa 2S, 17S, 24S and 35S. Impurities seemed to be present in amounts somewhat larger than normally found in aluminum alloys in this country. Aluminum bronze was used for several bearing parts. Steel parts were mostly plain carbon. Most of the alloy steels were chromium-molybdenum, one also having high manganese. Residual copper, nickel, and tin from scrap all ran high. The steel pistons in the hydraulic shock-absorber systems were plated with hard chromium, probably both for protection against corrosion and resistance to wear. The coating consisted of a flash of nickel and 0.0007 inch of chromium. Other steel parts in contact with magnesium were plated with cadmium. In some cases where no coating was used on the steel, the magnesium had corroded, preventing separation of the parts without destruction of one. Of primary interest was the use of both magnesium and aluminum in the housing for the tail landing wheel. Detailed data on the separate parts of the five assemblies examined and chemical and spectrographic analyses are tabulated. Photographs are included.

United States

PB 23154. GUEN, ROSS. Report on influence of electric field on aerodynamic drag coefficient. (Naval Res Lab Rept C-2298) May 1944. 8 p. Price: Microfilm-50¢ - Photostat-$1.00

In experiments on a B-25 at Minneapolis under carefully controlled conditions of flight, the application of a free electrical charge to the airplane, approximately equivalent to 100,000 volts impressed thereon, had a less than one percent influence on the total drag. It is concluded that an electric field has no appreciable effect on the drag coefficient. A cyclical application of the charge and discharge resulted in a set of data as given in table 1.

PB 20295. HANDELMAN, G. H. and HELLER, W. R. Aerodynamic lead pursuit curves for overhead attacks. (OSRD Rept 6383; NDRC Applied Math Panel Rept 106.2R; Brown Univ Applied Math Group Rept 79) Oct 1945. 82 p. Price: Microfilm-$1.00 - Photostat-$6.00

The pursuit curve studied here is the path traced by a fighter plane in attacking a bomber flying a straight, horizontal course at constant speed. The entire action takes place in the vertical plane. The fighter is actually regarded as an aeroplane; that is, aerodynamic forces and inertia are taken into account. Furthermore, the fighter's bullet velocity is assumed to be finite, and lead is taken to insure effective hits on the bomber. Section 1 contains a more precise statement of the problem, including the basic assumptions as well as a discussion of the simplified problems which have been studied previously. In section 2, the basic equations of motion are derived and the hypotheses which must be added to yield the relations governing the simplified problems are also discussed. These equations cannot be integrated in closed form; therefore, a technique of graphical integration has been employed. This method is discussed briefly in section 3. The results of the integration are discussed in section 4. A systematic study of the variations which occur with one particular fighter type, a P-47, is included. Special consideration has been given to the effect produced by changing the initial value of one of the variables, the dive angle of the fighter. By plotting the range vs. angle off an interesting comparison can also be made among corresponding pure pursuit, lead pursuit, aerodynamic pursuit, and aerodynamic lead pursuit curves. In the same fashion, the differences in four different fighter planes, P-47, P-51, P-38, and Tojo, have been examined. These results are indicated in graphs as well as in the accompanying discussion. Two appendices contain information pertinent to the computational aspects of the problem. Appendix I gives a sample computation sheet for finding the aerodynamic constants; additional check formulas have also been added. A complete discussion of the construction of the nomograms used in the graphical integration can be found in Appendix II. Reduced copies of the charts used in this study are included.

PB 23762. LEWIS, HERBERT B. Aircraft brakes. Progress report. (OSRD Rept 959). Sep 1942. 4 p. Price: Microfilm-50¢ - Photostat-$1.00

A progress report from the National Research Council on the developmental status of several aircraft brake designs indicates that (1) the Hayes 562 wheel and disc brakes are being flight tested; (2) drum brake improvements have been made; (3) an investigation to determine the necessity of farings on wheels is under way; (4) brake linings and expander tubes have been improved; (5) two new designs of doubtful merit have been submitted; and (6) improvement has been made in testing instruments.

PB 23766. NATIONAL RESEARCH CORPORATION. Fogging of vision devices under flight conditions. (OSRD Rept 894). n.d. 9 p. Price: Microfilm-50¢ - Photostat-$1.00

The condensation of moisture on glass and transparent plastic surfaces of aircraft windshields, sights and instrument dials under various flight conditions has been a matter of great concern because such condensation normally renders the transparent materials opaque to vision. This vision impairment effect is frequently referred to as "fogging". "Anti-fog" compounds whose active ingredient is a surface-active chemical have been developed and studied in the laboratory. Water films formed on glass and plexiglass surfaces pre-treated with an anti-fog compound have been observed to cause only negligible effects on the optical properties of dry glass.

The effect of this treatment is not permanent, although a surface treated with anti-fog compound will resist fogging over a number of condensation and evaporation cycles. This method of fog alleviation using anti-fog mixture, Experimental Type 1-A, was tested by the U.S. Navy Carrier Command at Pearl Harbor. Procedure and findings of flight tests are given. A partial solution to the fogging problem was indicated by these flight tests. This report also includes a discussion, illustrated with graphs, of the correlation of fogging and conditions and atmospheric data which indicates that given a set of temperature and humidity data at various altitudes it is possible to predict whether or not fogging will occur during any given flight maneuver.

PB 23530. U. S. ARMY AIR FORCES. AIR TECHNICAL SERVICE COMMAND, WRIGHT FIELD, DAYTON, OHIO. Heating apparatus for airplanes. (T-2 Intelligence Rept 103) Aug 1945. 14 p. Price: Microfilm - 50¢ - Photostat - $1.00

This report prepared by German technicians contains two parts. Part I takes up the Kärcher airborne HFO heating apparatus used to warm up wing and steering surfaces during flight, and also to heat armament and to prevent the formation of ice. The system is described and its workings and advantages and disadvantages are outlined and illustrated with drawings and diagrams. The Kärcher equipment can be used only in flight and involves the use of a mixture of air from an inlet part with fuel from a vaporizer. Part II "Heating apparatus for fighters" is a signed report by Karl Maier of Wien-Daggendorf on his development of a built-in directly fired air heater. The apparatus is operated by an airflow from the leading edge of a wing and requires no other driving force. This apparatus produces about 20,000 BTU per hour regardless of the speed or altitude of the aircraft. An air and gasoline mixture is burned by means of a "burnstone." Diagrams are included.

PB 22670. U. S. NAVY DEPARTMENT. EASTERN SEA FRONTIER. AIR SEA RESCUE COORDINATION CENTER. Transoceanic flight, air sea rescue information. May 1946. 21 p. Price: Microfilm-50¢ - Photostat-$2.00

This booklet lists the U. S. Government facilities available to aid trans-Atlantic flying. Sections are devoted to location of air sea rescue areas; weather and rescue ships; radio beacon transmission and position reporting grid system; description of rescue facilities on the East Coast of the United States; important briefing instructions; ship's daily position reports; notes on communications; and relaying aircraft position reports. Drawing of typical weather ship, map and graph are included.

PB 23537. WALTER and others. Experimental and theoretical research on flutter characteristics of the sweptback wing. (AAF ATSC T-2 Translation 507). Feb 1946. 47 p. Price: Microfilm-50¢ - Photostat-$4.00

Report of research on aerodynamic problems of flutter in sweptback wings, undertaken jointly by Henschel Aircraft Company and the DVL. In the experiments an attempt was made to ascertain whether flutter calculations made by using the model dimensions and parameters and assuming that air forces acting on the vibrating sweptback wing are based on a strip-wise two-dimensional incompressible flow, will lead to a sufficiently exact determination of critical velocities. Critical velocities so calculated agree satisfactorily, in many cases, with test values. The qualitative agreement of dependence curves, ascertained by tests and computations, is evident in all cases. A table of symbols used in calculations, many graphs, and a bibliography of 5 items are given. This report was translated at Wright Field, Dayton, Ohio.

Instruments

PB 22633. DEVORE, J. R. Examination of enemy materiel (OD-113) (AC-77): Luminescence of enemy aircraft instrument dials. Progress report 111, Aug 16, 1944. (OSRD Rept 4145; War Metallurgy Committee Rept M-368). Sep 1944. 14 p. Price: Microfilm-50¢ - Photostat-$1.00

The radioactive markings on Japanese instruments are 3 to 4 times as bright as the markings on German instruments. Although the dates of manufacture of the dials are not available, it is believed that this difference is not due to differences in age of the activated phosphors but rather due to an initial difference in intensity of activation. Two of the Japanese dials bore dates showing that they were about two years old. Their brightness values are the same order of magnitude as those of the radioactive markings on standard American dials two years after their manufacture. Consequently, the brightness of the Jap markings when new is probably close to the brightness of similar United States markings. The Japanese cockpit lamp is a much weaker source than either type of American lamp, and it also yields more visible light (principally in the red). However, the radioactive markings on the dials are legible to the dark-adapted eye. Consequently the weak source is sufficiently strong to produce easy legibility. Tables and photographs are included. This examination was made by the New Jersey Zinc Company Research Division.

PB 22526. JACKSON, L. R. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of a German aircraft master compass and a pilot (repeater) compass. Progress report 95, Jul 25, 1944. (OSRD Rept 4090; War Metallurgy Committee Rept M-360). Aug 1944. 30 p. Price: Microfilm-50¢ - Photostat-$2.00

These aircraft instruments were made chiefly of aluminum alloys either as Al-Si or Al-Mg-Si castings or Al-Mn stampings. Copper alloys were used for working units, springs, shafts or bearings. These parts were chiefly 10-20% nickel brass (nickel silver) with some highly machined pieces containing up to 1% lead. Bearings were usually copper-tin-zinc alloys of gunmetal analysis. One magnesium (9% Al) alloy casting was found in the German master compass. Other nonferrous alloys were encountered in the electrical system which made extensive use of silver-palladium slip rings and nickel-platinum contact wire. Pivots, magnets, and the gearing system of the pilot compass were made of ferrous material. Detailed data regarding the compositions of the various parts, and method of manufacture, and discussion of economic considerations involved in manufacture and of findings are included. Numerous photographs and tabulated data are given in this report prepared at Battelle Memorial Institute.

PB 22527. JACKSON, L. R. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of a German and a Japanese altimeter. Progress report 98, Jul 21, 1944. (OSRD Rept 4113; War Metallurgy Committee Rept M-358). Sep 1944. 17 p. Price: Microfilm-50¢ - Photostat-$2.00

Comparison of German and Japanese altimeters for details of structure, composition, and fabrication was made at Battelle Memorial Institute and is presented in this report. The two aircraft instruments, although similar in design and application, differed quite widely in the materials used for the more important parts. These differences are given in tabular form. The majority of the small parts in each instrument were made of brass and were nickel plated. Detailed description is included as well as a discussion of the economic considerations in connection with manufacture. Numerous photographs and tabulated data accompany this report.

PB 22530. JACKSON, L. R. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of two Japanese aircraft bank and turn indicators. Progress report 109, Aug 10, 1944. (OSRD Rept 4127; War Metallurgy Committee Rept M-367). Sep 1944. 27 p. Price: Microfilm-50¢ - Photostat-$2.00

It was found on examination at Battelle Memorial Institute that although both were identical in most respects, a number of significant changes had been made in the two years since the first had been made. The 1940 model weighed 1.68 pounds and the outer case was sand cast from a 4.22% Cu, 1.5% Mg, aluminum alloy and the gimbal ring was sand cast from a 3.8% Cu, 5.0% Si, aluminum alloy. The gyro was a forging made from a 1.1 Sn, 38.8 Zn, brass. The 1942 instrument weighed

1.56 pounds; and both and outer case and gimbal rings were die castings of 3.67% Cu, 5.0% Si, balance Al and 4.24% Cu. 4.9% Si respectively, and the gyro was a forged 41.5% Zn, 0.23% Sn brass. Other differences are described; economic considerations involved in manufacture, methods of fabrication and materials used are discussed. Data from chemical, spectrographic, microscopic, macroscopic, and physical examination are tabulated. Photographs are included.

Engines and Propellers

German

PB 23563. BRAV, MAX, tr. The Riedel highly volatile fuel starter of jet power plant 109-011 A-0; edited by L. W. Bossart. (AAF ATSC T-2 Translation 544). Apr 1946. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
The Riedel highly volatile fuel starter RBA/S is a starter for jet power plants. It is driven by a two-stroke engine which has two cylinders. By means of an overrunning clutch the turning moment of the engine is transmitted from the crankshaft to a gear with the ratio of 4.8:1 and from there to the starter claw which engages the counter claw of the jet power plant. The ordinary aviation fuel with an admixture of 5% oil is to be used as fuel. The main characteristics and operation and descriptive data on the starting engine are given in this translation of the German work, "Der Riedel benzin anlasser für strahltriebwerk 109-011 A-0."

PB 25022. BRITISH INTELLIGENCE OBJECTIVES SUB-COMMITTEE. Interview of Johannes Winkler regarding liquid propellant rocket units. (Halstead Exploiting Centre Rept 531) May 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
This paper reviews the work of Johannes Winkler who has been actively interested in the field of rocket propulsion since 1926 when he started theoretical studies of the performance of rocket units and investigated the possibility of space travel. He has experimented with the following rocket propellants: Liquid oxygen/liquid methane, liquid oxygen/gasoline, liquid nitrous oxide (N_2O)/gasoline, liquid blow gas as a fuel, and gaseous air/carbon. His most recent development is a rocket unit with liquid nitrous oxide/gasoline propellants with a mixture ratio of 3 to 1. Other characteristics of the unit are: Thrust, 120 kg; duration, 5 minutes; weight 5 kg; specific propellant consumption 6.3 gm/kg per second. This unit was good for two or three runs of 5 min. each before it burned out.

PB 23087. CAMPBELL, K. Information on the aerodynamic design of axial flow compressors in Germany. (U.S. Naval Tech Mission in Europe Tech Rept 546-45). Oct 1945. 73 p. Price: Microfilm-$1.00 - Photostat-$5.00
This report sets forth details of research and design procedure on axial flow compressors for jet engines as obtained from extensive conversations with Ing. Karl Pichert formerly of the turbo-jet development plant of B.M.W., Dr. Bruno Eckert of F.K.F.S., Dr. Bentele and Dipl. Ing. Kassner of Heinkel in Stuttgart. An extensive bibliography of 42 items on axial flow compressors, cooling fans, and other compressor types is appended. Photographs, charts, graphs, and tables of design data are included.

PB 25015. DIEKSEN. Statement on the present research results on eight nozzles. (BIOS Halstead Exploiting Centre Rept 537) n. d. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
Eight rocket nozzles of 4 different alloys and both hyperbolic and conical external shape were tested in a "Strahlofen" at about 1800° and 35 atms. internal pressure. The temperature regulation of the gas stream required about 3 sec. after the ignition. The nozzles showed very different behavior under working conditions. Individual results of research on each of the four types of nozzles are given with two unlabeled photographs.

PB 23552. HENYEY, REYNOLD, tr. Investigations regarding two different designs of radial supports for the turbine bearing of the model 109-011 jet engine; edited by Kurt Urbach. (AAF ATSC T-2 Translation 528). Apr 1946. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
A mathematical investigation of the stress upon the struts of a bearing support under two types of loads when calculated as statically undefined systems. Computation was made on a dead load vs. the centrifugal force during pull-out. The two types of design were (1) 3 struts with the heat stresses to be absorbed by soft diaphragms, and (2) a bearing support, planned for present engines, consisting of 4 struts at angles of 60° and 120° with one strut rigidly attached. The tube of the first design was proved to be much too weak for the rigidity necessary when used with a soft diaphragm. The latter design is recommended, though further investigation of designs and variations is under way. This is a translation of "Festigkeitsuntersuchung zweier verschiedener lagersternkonstruktionen für das turbinenlager des gerätes 109-011".

PB 23559. EBERHARDT, EDWARD A., tr. Instruction manual for Jumo special power plant 004; edited by Alfred Kugel. (AAF ATSC T-2 Translation 538). Apr 1946. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
A discussion of the principles of jet propulsion precedes a description of the main parts of the Jumo special power plant 004. These consist of combustion chambers, a thrust nozzle with bullet control adjusted by means of a hydraulic oil motor, an axial compressor, a Riedel 2-cylinder, 2-cycle starter engine and a constant speed governor. The starting of the engine and the control of the power plant by rotational speed control, and by temperature regulation, and the setup and mode of operation of the constant speed governor, and of the thrust nozzle bullet control with hydraulic oil motor are clearly explained. Small drawings explain clearly and graphically the principles of jet propulsion engines. This report is a translation of a German report by Junkers Flugzeug-und Motorenwerke A.G., entitled "Lehrbeschreibung, Jumo-Sondertriebwerk 004".

PB 22931. FARRAR, E. V. Development of BMW reciprocating engine components. (Naval Tech Mission in Europe Tech Rept 368-45) Oct 1945. 31 p. Price: Microfilm-50¢ - Photostat-$3.00
This report covers information on the design and development of piston engine components obtained by interrogation of persons engaged in the design and testing of piston type engines at the BMW plant, including Dr. Ammann, Messrs. Biefang and Buske, Dr. Wiegand and Dr. Sawert. The complete engines are described in other reports. Design features and developments worthy of note by American designers include information on aftercoolers; roller and accessory shaft bearings; crankpins; radial engine supercharger clutches; cooling fins on cylinder barrels; materials used for cylinder barrels and cylinder heads; joint type crankshafts; vibration dampers for crankshafts; gears; ignition and lubrication oil systems; engine mountings and others. Very clear drawings of some of these applications are given.

PB 22798. HASKELL, H. C. Bavarian Motor Works (BMW) - A production survey. (Naval Tech Mission in Europe Tech Rept 101-45). Jun 1945. 64 p. Price: Microfilm-$1.00 - Photostat-$5.00
This semi-technical report endeavors to cover the history, layout and objectives of the Bavarian Motor Works (BMW), representing one of the four leading aircraft engine and jet producers in Germany. Subjects discussed include: Production engineering and design limitations of 003 turbojet engines; design highlights for the 003 A-2 turbojet, 018 turbojet and 028 PTL gas turbine; production trends; the use of salt mines as factories--Eisenach Area Mines, Nordhausen Mines and Staassfurt Mines; employment policy; production schedules; Junker 004 vs BMW 003; tests stands; and government supervision. Special attention is given to problems encountered in tooling for mass output and to changes in turbo-jet conversion program. Brief comments are made on the following varied items: Forged cylinder heads, impellers, cylinder finning, altitude chamber, "solid" cement factories, cast steel crankshaft and an automatic flight engineer. Photographs of engines, airplanes and personnel are included.

PB 14756. HEINRICH HERTZ INSTITUT FÜR SCHWINGUNGSFORSCHUNG. Kurbelwellen-berechnung von 4 flugmotoren-wellen. (Calculations for four aircraft motor crankshafts). (ALSOS Mission, Klotter File 9 a). 1930. 39 p. Price: Microfilm-50¢ - Photostat-$3.00
This report, in German, contains: (1) a discussion of the calculations for the design of crankshafts with special application to the Junkers motor L II; (2) a description of graphic methods for the determination of torsion resonance curves and determination of strain; (3) the application of results received to the construction of crankshafts for the Junkers aircraft motor types L II and L V, and BMW4 and BMW8a. Graphs and tables are included.

PB 22800. KELLER, ALLEN and HEMBERGER, C. F. BMW high altitude aircraft engine test plant at Oberwiesenfeld (near München) Germany. (Naval Tech Mission in Europe Tech Rept 165-45) Sep 1945. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
This report gives certain design, operation and equipment data for the subject engine test plant. In this plant, complete aircraft engines may be tested at any atmospheric pressure and temperature conditions from sea level to approximately 40,000 feet altitude, and with any desired amount of inlet ram. A diagrammatic sketch of the arrangement of the piping and the equipment, and photographs of the BMW 109-003 jet engine installed inside altitude test chamber and of view inside altitude chamber looking toward air discharge end are included.

PB 23556. REUTTER. Devices, gears, and equipment for the jet engine 109-011. (AAF ATSC T-2 Translation 532). Feb 1946. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a translation of the German report "Geräte, getriebe und ausrüstung für 109-011". It is an outline of modifications to be made by sub-contractors on the entire engine equipment, giving a time limit for changes, the expediter responsible, and a blank payer column. A rough drawing is appended.

PB 14595. SEIFERT, A. Prüfungen von flugmotoren auf dem prüfstand. (Stationary testing of aircraft engines). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik, III B 8). (ALSOS Mission, Klotter File II C). Nov 24, 1938. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
The report describes methods of testing aircraft engines on test stands. Tests are described for determining ground level and altitude performance. Individual parts tests of piston, cylinder, bearings, etc. are presented and illustrated. Formulas for measuring the properties of motors are discussed. This report does not deal with testing of engines in the plane. Graphs, drawings and photographs are included.

PB 23539. SISSINGH, GERHARD. Air and mass forces on helicopter propellers with inclined hinge. Supplementary report. (AAF ATSC T-2 Translation 510). Feb 1946. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This report deals with the aerodynamics of a helicopter propeller with twisted trapezoidal blades where each two blades displaced at a 180° angle in plane of rotation are rigidly joined together and connected with the rotor axis through a horizontal inclined hinge. The formulas for the axial thrust as well as the first and third harmonics of the flapping motion are derived. This report translated from the German supplements the article, Luft und massenkrafte bei steilschrauben mit schräggelenk, in the Jahrbuch 1943 der deutschen Luftfahrtforschung.

PB 23545. SPIEGELMAN, REGINA, tr. Light metal Neral radiators; edited by Emilia Wilder. (AAF ATSC T-2 Translation 520). Apr 1946. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Tables present the cooling power and resistance values of two light-metal radiators made by the Neral process, and the cooling powers for J-installations are compared with the corresponding values for the Fenag and SKF systems. A graph and a sketch of the light metal gilled tube system are included in this translation from the German.

PB 22298. ULLMANN, K. and HERSCHMANN, O. Research in jet propulsion: Increase of thrust in jet propulsion by afterburning, dependent upon combustion chamber charge, nozzle strain, and precompression. Fourth report. (AAF ATSC T-2 Translation 462). Apr 1945. 54 p. Price: Microfilm-$1.00 - Photostat-$4.00
This is a study by the Director and Group Leader of the Institute for Reciprocating Engines of the Technical High School in Dresden. Many methods for a continuous or momentary thrust increase are explored, and the advantages and disadvantages of the use of thrust increase in the jet unit vs. the use of additional rocket thrust, especially at high altitudes, are discussed and presented in tabular form. This translation of the original German documents was prepared at Wright Field, Dayton, Ohio. The report contains more than 20 graphs and drawings from the original papers. Many of these will reproduce very poorly.

PB 23346. U. S. STRATEGIC BOMBING SURVEY. Aero-engine and automobile factories of Bayerische Motorenwerke A.G.: (BMW) at Munich (Oberwiesenfeld) and (Allach). (Rept 18; Aero Engine Plant Rept 4). Oct 1945. 71 p. Price: Microfilm-$1.00 - Photostat-$5.00
These two plants are located in small Munich suburbs on the north and northwest outskirts of the city. They produced engines for Junkers-52 transport planes and FW-190 fighters, and experimental engines including jet engines, rocket engines, and their components. Air attacks held production down to only 75% of planned schedules, and prevented their entering upon a large scale production of anti aircraft rockets which might have caused the Allies much difficulty. Tables of attacks, tonnage of bombs dropped, hits, and intelligence reports on blast and incendiary damage showed that the damage exceeded the recuperative power of these plants, though they were well organized and well managed privately owned plants with a well worked out dispersal system. Many photographs, bomb plot maps, charts, tables of damage done and bomb density per acre, and the table of planned and actual delivery of planes at each plant are given.

PB 23021. WALKER, D. N. and PICKLES, F. E. Report on aircraft gas turbine engine developments at Junkers, Dessau and associated factories. (CIOS File XXXI-66, Item 5). Aug 1945. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
Interrogation of Dr. Franz and other engineering personnel of Junkers at Dessau on the development, production and testing of the Jumo 004 engine and the projected 012 engine brought out some of the weaknesses and strengths in the design and testing of the compressors and other components. Production and testing of Ju-004 engines at Maldenstein, Kothen and Nordhausen is touched upon but this report is not complete since it is designed to supplement earlier reports. A complete list of the personnel of this gas turbine organization is included. A photograph of compressor and turbine blades of the Junkers 012 engine is appended.

PB 23100. WILLIAMS, GEORGE. B M W materials and engine component testing laboratory. (U.S. Naval Tech Mission in Europe Tech Rept 480-45). Oct 1945. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
The report describes this large, well planned, well equipped German laboratory and the functional organization planned to coordinate materials testing and research with service testing of engines and components. The laboratory was originally designed for aircraft engine research but since 1942 had concentrated on research on materials for high temperature operation of gas turbines and compressors. The facilities, including the building, equipment, arrangement, func-

tional organization and personnel, compare favorably with the best in the United States. It is recommended that test machines for the determination of static and dynamic strength of materials, creep test machines, X-ray machines for the examination of hollow members, be removed to the U.S. and set up for investigation and use. Photographs, tables of testing equipment and an organization chart are included.

PB 25023. WISEMAN, L. A. Interrogation of Dr. Grunbt at Trauen (outstation of L.F.A.) in the presence of Dr. Busemann, regarding the development of rocket motors based on liquid oxygen and Diesel oil. (BIOS Halstead Exploiting Centre Rept 532) Jun 1945. 3 p.
Price: Microfilm-50¢ - Photostat-$1.00
The Goering Institut für Gasdynamik Flugprüfstelle, Trauen, was concerned only with the development of rocket motors based on liquid oxygen and Diesel oil with a view to obtaining the maximum efficiency of energy conversion. Their results had not been applied to the design of any weapons. The most recent work was on a rocket motor giving a thrust of 100 kgms, while the biggest rocket used gave a thrust of 2000 kgms. The best experiments measuring the temperature of the exhaust gases by the sodium inversion method indicated a temperature of 2650°C. A method for determining the velocity of the exhaust gas stream was developed and is explained briefly herein. Experiments had been undertaken on the following projects, none of which had advanced beyond the first stages: Use of liquid N_2O_4 as an oxidant, use of H_2 as a fuel, use of atomic hydrogen, and use of a Lorrin tube mounted on a Do 172 to increase the velocity of the aircraft.

Japanese

PB 22512. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of a Japanese aircraft oil radiator. Progress report 84, Jun 17, 1944. (OSRD Rept 3920; War Metallurgy Committee Rept M-333) Jul 1944. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
Examination at Battelle Memorial Institute disclosed no unusual features. The copper alloys and solders used were made to specifications similar to American standards. The workmanship is poor and is not the equal of other Japanese aircraft assembly standards. This type of radiator is obsolete and has been replaced on later models of "Oscar" with a box-type honeycomb radiator. Table and photographs are included.

PB 22516. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of a Japanese Sakae-12 aircraft engine mount. Progress report 73, Jun 24, 1944. (OSRD Rept 3967; War Metallurgy Committee Rept M-340). Jul 1944. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
This report covers the examination of a welded tubular engine mount for a Sakae-12, 14 cylinder Japanese radial aircraft engine for quality of welding, methods of manufacture and materials. The workmanship was good, gas welding was used, and the tubes and forgings approximated SAE-4130. The torch welding was of high quality. Several different lots of steel appeared to have been used. The nickel content, presumably residual and not intentionally added, varied considerably from lot to lot. Discussion of economic considerations and of the findings are given. The report of this examination in which Battelle Memorial Institute, Bethlehem Steel Corporation and the A. O. Smith Corporation cooperated also includes photographs of the mount, diagrams showing Vickers hardness survey of parts and welds and tabulated data.

PB 22528. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of four different types of Japanese aircraft spark plugs. Progress report 99, Aug 5, 1944. (OSRD Rept 4125; War Metallurgy Committee Rept M-362). Sep 1944. 8 p.
Price: Microfilm-50¢ - Photostat-$1.00
The four types of aircraft spark plugs examined were of mica construction. Two types had cooling fins. All of the plugs were cadmium plated. The electrodes were forged and annealed. The 2-electrode plugs had high Ni-Cr alloy central electrodes (14.3% Ni, 24.6% Cr). Nickel alloy tips were resistance welded to the Ni-Fe-Cr alloy cores of the 3-electrode plugs, and to the Ni-Cr-Mo alloy cores of the 4-electrode plugs. The Ni-Fe-Cr alloy central electrode of one of the types was drilled and a copper core inserted, and a low carbon steel rod was then resistance welded to it to form the upper part of the electrode. The ground electrodes were made in ring form from high nickel alloys, and were held in place by the rolled edge of the case bushing. The spark plug case, barrels, and bushings were machined from medium carbon steel. Copper, brass, and low carbon steel bushings were used as thermal conductors between the central electrode and spark plug case. Table and photograph are included.

PB 22513. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of selected parts from Japanese type 100, radial, 1450 h.p., aircraft engines. Progress report 80, Jun 9, 1944. (OSRD Rept 3921; War Metallurgy Committee Rept M-334). Jul 1944. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
Eighteen of the 23 steel parts examined were of an excessively high nickel-chromium steel. The other five steel parts were made of a chromium steel. Electric furnaces were used for making most of the steel. All but four parts were forged. The wearing surfaces of the gears were case hardened, and without an exception, no case hardening was observed on the tip of the gears. No hand operations were evidenced, and with the exception of the propeller shaft bearing, no unusual wear or fatigue failures were observed. An ample supply of lead is indicated by the use of 15 ozs. per clutch and the use of leaded bronze in the majority of bushings. The cap was an aluminum bronze with a high percentage of aluminum, iron, and manganese. A phosphor-bronze bushing was used in the articulated rod assembly. The impeller and the aluminum arm of control assembly were of a duralumin type. The light metal housing was of a modified aluminum-silicon alloy with .41% Co added, and contained a porous powdered copper-tin-graphite alloy bearing impregnated with oil. The piston (F.E.A.No. J1521) was of a high temperature alloy type comparable to the English Y alloy and Alcoa Alloy 142, but with a lower percentage of nickel (.70% comparable to 2.00%). The details of material, properties and manufacture are tabulated. Photographs are included.

PB 22509. LEVOE, C. E. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of a Japanese aircraft exhaust stack and collector ring. Progress report 48, Mar 21, 1944. (OSRD Rept 3887; War Metallurgy Committee Rept M-254) Apr 1944. 13 p.
Price: Microfilm-50¢ - Photostat-$1.00
Metallurgical examination of the above named exhaust stack and collector ring at Battelle Memorial Institute showed that both pieces were of low carbon, 18 percent chromium, 8 percent nick, stainless steel, stabilized by the addition of a small amount of titanium. The amount of titanium used was considerably less than the amount used in American practice. The parts were stamped from thin rolled sheet and gas welded, using a rod of a composition similar to the base metal but apparently without titanium. Detailed discussion of the findings is given, also the chemical analysis, photographs of the equipment, and photomicrographs showing structure of main parts and of welds.

PB 22514. HARDONK, R. M. Examination of enemy materiel (OD-113)(AC-77): Design features and performance characteristics of the Japanese hand and electric inertia starter. Progress report 86, Jun 23, 1944. (OSRD Rept 3922; War Metallurgy Committee Rept M-337). Jul 1944. 14 p.
Price: Microfilm-50¢ - Photostat-$1.00
This starter was obtained from stores captured in the occupation of Attu Island, and appeared not to have been in service. It was sent to the Bendix Aviation Corporation, Eclipse-Pioneer Division at Teterboro, New Jersey, where it was exam-

ined and this report prepared. It was found that this Japanese starter, except for minor changes, was an exact copy of the original Eclipse Series 11 version of the hand and electric inertia starter. A detailed description of the various parts and a comparison of the physical and performance characteristics of the Japanese starter with the Eclipse original is given, together with a discussion of design features, material, and manufacture. Photographs and plotted curves showing acceleration run of the Japanese starter are included.

PB 22642. SMITH, E. M. and GONSER, B. D. Examination of enemy material (CD-113) (AC-77): Metallurgical examination of oil cooler from Japanese aircraft "Betty". Progress report 120, Aug 31, 1944. (OSRD Rept 4279; War Metallurgy Committee Rept M-395). Oct 1944. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This oil cooler was captured on Roi Island in the Kwajalein Atoll in February 1944. Examination at Battelle Memorial Institute showed that the shell of the cooler was constructed from alpha brass sheet and enclosed banks of alpha brass air tubes that had been flanged and dipped in solder to form a honey comb type of radiator. In addition to being riveted the cooler shell was also soldered to assure oil tightness. The inlet was cast from a 10 Si, 90 Al alloy. The by-pass valve and remainder of the aluminum fittings contained 5 percent magnesium. Inlet fittings, flanges, nuts and bolts, and drain plugs were machined from low-carbon steel. Discussion of the economic considerations involved in manufacture and of the various alloys, solder and paint used is included. A photograph of the cooler and tabulated data are presented.

United States

PB 23553. DREYER, REYNOLD, tr. Tests regarding the load carrying capacity of the model 109-011 jet engine housing using a bomb load; edited by Kurt Urbach. (AAF ATSC T-2 Translation 529). Mar 1946. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Investigation and tests were conducted at the Institute for Testing Materials of the Polytechnic Institute at Stuttgart, to determine what load can be attached to the lower points of attachment at the front end of the housing if the radial deformation of the housing at the plane of attachment is not to exceed 0.5 mm. It was concluded that at a load factor of 3.5, a bomb load of 110 kg is possible when the housing is not reinforced and the diameter deformation does not exceed 1 mm., as specified. In the case of reinforced housing, this bomb load may amount to 410 kg. The effect of the injector housing is important and greater than that of the accessories support. Load tests will have to be made later on the newly designed V-14 housing. Bomb load curve is included. Translated from the German.

PB 23634. SCHULZE, J. O. Investigation of ice formation on aircraft engine cooling fans. (AAF ATSC Tech Rept 5396; Whirl Test 1981). Dec 1945. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
Test to determine the type of ice accumulated by an aircraft engine cooling fan at below freezing temperatures as conducted at Wright Field. A description of the test procedure and results at various r.p.m. at -8°C., are given, and photographs present the results. Tests under more favorable air-flow conditions are recommended.

PB 23632. SCHULZE, J. O. Investigation of ice formation on aircraft engine cooling fans. (AAF ATSC Tech Rept 5408; Whirl Test 2037). Jan 1946. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Tests on a cooling fan with 90 stamped sheet metal blades, which was sprayed with water at below freezing temperature to determine the nature of the ice build-up, indicated that the ice build-up was over the entire blade. The test did not duplicate conditions of natural icing. A description of the procedure of testing and the time of ice formation at different r.p.m. is given, but flights in natural icing conditions or tests in the NACA Ice Research Tunnel are recommended. Photographs are included.

Airports and Airways

PB 22950. WERNISCH, GEORGE R. German methods of stabilising soils for airfield runways. (Naval Tech Mission in Europe Tech Rept 435-45) Sep 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Interrogation of Dr. Rummel, of the Staatlicher Material Prüfungsamt, who conducted tests for and advised the Luftfahrt, showed that the methods used were standard and only moderately successful. Two methods were generally used. Bags of cement were emptied on the soil and harrowed to mix cement and soil to a depth of about 8 inches, then sprinkled and rolled or vibrated with a flat screed, according to the character of the soil. The second method involved mixing earth, water and cement in a concrete mixing machine and spreading it on the soil to a depth of 8 inches and vibrating it with flat screeds. From 90 to 160 pounds of cement per square yard of surface, depending on the soil, was used for the first method, and about 90 pounds for the second. American concrete runways are considered more advanced and more satisfactory in this report.

LAND TRANSPORTATION

German

PB 23105. CRONSTEDT, V. Bayerische Motoren Werke A.G. (U.S. Naval Tech Mission in Europe Tech Rept 453-45). Sep 1945. 127 p. Price: Microfilm-$1.50 - Photostat-$9.00
This account of the history of BMW outstanding European firm engaged in the design, development and production of aircraft engines covers the period from 1935 to 1945 and discusses the most significant developments of the plant during that time. An organization chart shows the relationship of the engineering division to the operation of the whole. Biographical sketches are given for 64 members of the organization. Engineering projects are presented in a chronological table. Tabulations are included of engineering equipment and charts showing the growth in amounts of equipment during the last ten years. Expenditures for capital and operating accounts are also presented. Distribution of manpower and its variation with time in the various categories is shown. Some of the pages will reproduce very poorly.

PB 20002. GERMANY. DEUTSCHE REICHSBAHN, ZENTRALAMT. Mci - wagen (Drawings of railroad cars) 1943. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This material consists of eight drawings issued by the German Railways main office of the Mci-railway car and the various ways in which it can be equipped and used. The first drawing shows the original car empty, the other six drawings first equipment and uses as follows: (1) as a combination personnel and luggage car; (2) as a troop car with thirty-six beds; (3) as a troop car with twenty-one beds; (4) as a sanitary troop car with bunks for hospital trains; (5) as a kitchen car for hospital trains; (6) as a troop and hospital car with bunks, and (7) as a kitchen car for hospital trains.

PB 20012. GERMANY. REICHSVERKEHRSMINISTERIUM. Die deutsche reichsbahn improvisiert. (The German railways improvise) Dec 1944. 22 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a German propaganda booklet issued by the German transportation ministry to bolster the morale of the German worker and particularly the personnel of the Government railroads. It appeals to all Government railway personnel to work and count every hour and every kilogram, to strive for technical perfection with the least expense and to study the art of improvising. Several sketches with brief description showing how work and maintenance of the railroads can be carried on by improvised methods are included.

PB 18284. HOMBERG, H. Unterstützungskonstruktion für das 5. gleis im erzlager-hochofen. (Support construction for the fifth track of a rail (to transport ore from) ore deposit to blast furnace. (MISVII 65 c 12 7002295)
May-Jul 1939. 54 p. Price: Microfilm-$1.00 - Photostat-$4.00
This material consists of twenty-seven drawings of supporting columns for an overhead track for transporting ore deposits to a blast furnace. The drawings are by Ing. H. Homburg, Wuppertal-Barmen, Germany.

PB 23182. LINDBLOM, C. A. and PARRY, J. R. Combination air-oil-cooled engine development for 3-ton Opel-Blitz truck. (CIOS File XXXII-60, Item 19). n.d. 124 p. Price: Microfilm-$1.50 - Photostat-$9.00
This report discusses the development of semi-oil-air-cooled gasoline engines for heavy duty. The engine based on a BMW construction for stationary engines had an air-cooled cylinder head and an oil-cooled cylinder block which permitted the use of the same tooling and machinery as on the production engine. The air-cooled part consisted of a low pressure axial fan, located on the left side of the engine at the level of the cylinder heads, and driven by a double V-belt at 1.6 crankshaft speed. A special revolving piston pump was designed for the oil circulation which operated at very low oil temperature. A similar semi-oil-air-cooled engine with more advanced and novel ideas, the Opel-Hallbluft, was at the testing stage at the end of the war. The discussion is paraphrased from two papers by F. W. Maseberg and Alfred Petzig. Photographs and many large design drawings are included.

PB 23736. LINDBLOM, C. A. and PARRY, J. R. Maybach HL234 tank engine. (CIOS File XXXII-62, Item 18).
Sep 1945. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
Information for this report was obtained at the Maybach Motorenbau, G.m.b.H. at Friedrichshafen, Germany. This experimental engine developed for Panther and Tiger tanks, is basically the HL-230 engine developed to have a 200 h.p. increase in power due to petrol injection instead of carburetion, improved volumetric efficiency and increased compression ratio. The HL-293 R single cylinder Diesel engine was also developed by Maybach, and also a Diesel engine head and piston were developed so that the HL-234 engine could be converted to the Diesel cycle if the fuel problem made it necessary. Some brief items of information on the HL 230 engine are also included. Drawings are listed in Appendix A but none are included in the report.

PB 22442. MODINE, A. B. Process of making automotive radiators using integrally finned channel - machined from flat zinc sheet. (FIAT Final Rept 580) Dec 1945.
3 p. Price: Microfilm-50¢ - Photostat-$1.00
A design drawing is included.

PB 22652. POPE, A. W., JR. Bussing-Nag model LD6 Diesel 100 HP truck engine. (FIAT Final Rept 605). Dec 1945.
6 p. Price: Microfilm-50¢ - Photostat-$1.00
In this brief report section on the Bussing firm and their output of gasoline and Diesel engines for trucks precedes a description and Engine Specification table giving performance and design characteristics of the Bussing-Nag Model LD6 truck Diesel engine. This is a 4-cycle, 6-cylinder, 4.32" bore and 5.11" stroke 105 HP Diesel engine which can be operated on producer gas with spark ignition by a change in combustion chambers. Performance economy and service claims for this engine are very high because of the design of their precombustion chamber. Side and front view photographs of the engine are given.

PB 23024. REEVES, G. C. The war time activities of Dr. Ing. H.C.F. Porsche, K.G. (CIOS File XXXII-122, Item 18).
1945. 436 p. Price: Microfilm-$4.50 - Photostat-$29.00
This report contains a record of development work in connection with tank, automotive and aviation engine design carried on by the Porsche organization during the war. Apart from its size and weight, the following are the most interesting features of the Mans, one of the vehicles described in detail in this report. (1) Electric transmission is fitted controlling a greater amount of power than in previous tank designs; (2) a complete weight analysis is given showing the scale effects of the increase in size over normal tanks, upon the percentage of the total weight given to various components; (3) a water jacketed exhaust manifold is fitted to achieve exhaust system cooling, a naval feature in tank design and worthy of application in connection with silencing and reducing flame propagation and exhaust glow; (4) the auxiliary power plant has a wider field of application than normal, giving pressurization of crew compartments for air conditioning and submersion purposes, crew compartment heating, poison gas filtration, and battery charging; (5) the final drive input shaft is designed on torsion bar principles, to give angular deflections to minimize shock loading; (6) a new volute spring suspension is fitted embracing both normal and plain bearing alternatives; (7) the driver's seat and many of the controls are movable into two alternative positions in regard to their height above the floor. A low silhouette was the major design feature of the projected 27-ton Sturmgeschutz, which uses an automatic hydraulic transmission designed by Voith. The 16-cylinder X air-cooled C.I. engine was designed for tank use and incorporates all Porsche's latest ideas. The single cylinder test engine curves are included. The use of compression ignition and air-cooling for the 2-cylinder air-cooled C.I. engine is novel. A combined oil filter and defoamer was fitted to the 10-cylinder air-cooled carburetted petrol engine. Details of endurance tests, methods of carrying out design calculations, etc. are given in the appendices. Other sections are devoted to the Voith hydraulic transmission for Porsche Tiger 102, Porsche Bogey type torsion bar suspension, Porsche torsion bar design standards, tank flotation and amphibious tracked vehicles, Gimbal mounted driver's visor block, tank and wheeled vehicle wading, and producer gas driven tractor. Each section contains a detailed discussion, photographs and drawings of the vehicle or engine, tables presenting test data, and appendices containing additional data (often translations of German documents). Chart of Porsche organization is also included.

PB 23390. U. S. STRATEGIC BOMBING SURVEY. Effects of bombing on railroad installations in Regensburg, Nuremberg, and Munich Divisions. (Rept 202; Transportation Div Rept 2). Oct 1945. 157 p. Price: Microfilm-$2.00 - Photostat-$11.00
This is a detailed study of a limited segment of the German railway system under air attack. Data collected in the field included complete German records of all bombing incidents upon the railroad system in these divisions together with bomb plots for all major attacks upon railroad yards. In addition, German railway officials added detailed accounts of the effect of traffic interruptions resulting from these raids, of the repair effort applied, and the effective date of repairs. This report attempts to evaluate the direct effects of the bombing of specific railroad targets in Germany, in the Regensburg, Nuremberg, and Munich areas. The network of lines was so vast in this area that it was impossible to do enough damage to seriously impede the flow of essential traffic. There can be no determination of the bomb drop necessary to eliminate a yard entirely. A bomb which hit a munition train put a yard completely out of business for 18 or 19 days. A case of nine hits on one yard closed a yard for six days although the through tracks were ready for traffic in less than a day. It was concluded that the damage done to the yards depended more on the part of the yard hit than on the weight of bombs with which it was hit. The desgruction of critical points in marshalling yards appears to be the most effective means of interfering with railroad transportation. The air raids on each of the three divisions are enumerated chronologically and the damage resulting from each raid is specified. Maps of the areas, graphs showing traffic and loading of trains, performance of cars, and yard performance supplement the report.

PB 23389. U. S. STRATEGIC BOMBING SURVEY. The effects of strategic bombing on German transportation. (Rept 200). Nov 1945. 207 p. Price: Microfilm-$2.50 - Photostat-$14.00
An analysis, by teams of investigators of the Transportation Division of the Bombing Survey, of the condition of German transportation during the war, and the effects, both direct and indirect, of Allied bombings. Original bombings of railroads were as targets of opportunity, when conditions prevented the bombing of selected targets. In March 1944, a definite plan of attack of rail transportation was formulated that made it second in importance only to oil. This report outlines the plans, their effect upon highway and waterway transportation and coastwise shipping. It gives a detailed analysis of air attacks on freight traffic trends, Wehrmacht traffic trends, damage to locomotives, rolling stock, and marshaling yards, and line cuts and bridge destruction. The problems of maintenance of right of way and repair of rolling stock, signals and communications are described. While it is impossible to separate the economic consequences of air attacks on transportation from the decline in output due to other causes, the effects of the coal shortage and the shortage of raw materials in the steel industry are studied. The loss of transportation facilities disorganized the flow of basic raw materials, components, and semi-finished materials of industry and the distribution of finished products. An analysis of types of damage done by bombings is given, but it was considered impossible to separate and evaluate the most effective type of attack.

PB 23368. U. S. STRATEGIC BOMBING SURVEY. German motor vehicles industry report. (Rept 77). Nov 1945. 68 p. Price: Microfilm-$1.00 - Photostat-$5.00
Economic survey of the German motor vehicle industry from its stimulation after Hitler came to power to its late, uncoordinated conversion to war effort in 1943, and its subsequent production losses because of bomb damage. Standardization and reduction of models, and complete production for war use characterized the 1944 output. Bombing attacks from November 1943 and through 1944 caused losses so great that the Panzer units lost their maneuverability. An evaluation of the effectiveness of the bombing program of the allied forces indicates that HE blast damage followed by incendiary bombs can cause the greatest damage, as the HEs collapse the roofs, and the debris around the machines burns to cause great damage to wiring and equipment. Graphs, charts, maps and tables are included.

United States

PB 23786. FORD MOTOR COMPANY. Amphibious reconnaissance car 1/4-ton 4 x 4 model: Specifications. (OSRD Rept 922). Aug 18, 1942. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
Specifications for a quarter ton amphibious reconnaissance car which would have a speed of at least 50 miles per hour on land, and a maximum speed of 6.5 miles per hour on water. Specifications include gradeability, traction devices, chassis, frame, power unit, engine, lubrication system, ignition system, fuel system, exhaust system, clutch, transmission, transfer case, propeller shaft, marine propeller, axles, springs, shock absorbers, wheels and tires, brakes, electrical equipment, chassis equipment, controlling mechanism, operating mechanism, cab and body, bilge pump, name and information plates and special operating equipment. A summary of the development and testing of the vehicle built to these specifications is appended. There is a large ¼ size drawing of the scout car included.

PB 23761. PUTNAM, P. C. Development of weasel, with notes on problems of its use. Interim report. (OSRD Rept 1024). Nov 1942. 79 p. Price: Microfilm-$1.00 - Photostat-$6.00
After surveying various possible vehicles, a conventional track-laying vehicle was selected as the one most likely to meet the military requirements in being able to traverse rock, hard ground and various types of snow. The Studebaker Corporation developed the production model. Included in this report are: A table of specifications for the Weasel, a report of performance characteristics according to the War Department questionnaire, tables of comparative performance of the Weasel and other snow vehicles, characteristics of each vehicle tested, changes and improvements made as a result of tests, and the possibilities for future improvement. A study of the physical properties of snow in relation to vehicle performance by Dr. Herman Mark of the Brooklyn Polytechnic Institute, and a report on meteorological forecasts of vehicle performance by Col. Sverre Pettersen are included. Photographs, graphs, and charts supplement text.

PB 27682. U. S. CORPS OF ENGINEERS. MISSISSIPPI RIVER COMMISSION. Trafficability of soils. Sep 1945. 92 p. Price: Microfilm - $2.00 - Photostat - $7.00
This report covers a limited investigation of soils classification and trafficability in relation to military vehicles. Principal factors affecting the trafficability of soils and instruments and procedures for measuring these factors were studied. Trafficability tests were conducted using certain military vehicles, and the results were correlated with the values obtained with the selected instruments and procedures and tabulated. Military vehicles were divided into five classes depending on their ability to move in mud. Results of the investigation indicate that soils can be divided into three phases of moisture conditions. On the basis of data obtained and observations and experience of the personnel conducting the tests, a table was prepared showing the relationship of moisture content, cone bearing value, slipperiness, and stickiness to the mobility of standard military vehicles. Photographs, curves and appendices are also included.

PB 23502. U. S. WAR DEPARTMENT. Trailer K-34-D. (Tech Manual 11-1056). Dec 1, 1943. 52 p. Price: Microfilm-$1.00 - Photostat-$4.00
This is a 4½ ton, drop-frame, four wheel trailer designed to be pulled behind almost any type of heavy duty towing vehicle. The chassis frame is an all welded unit of pressed high-tensile steel. Instructions are given for the operation, maintenance and servicing of the equipment and its component parts. Photographs, diagrams, tables, parts lists, and a list of manufacturers are included.

PB 23763. YELLOW TRUCK AND COACH MANUFACTURING COMPANY GENERAL MOTORS TRUCK AND COACH DIVISION, PONTIAC, MICH. Model - DUKW 353. (OSRD Rept 1005) Oct 1942. 71 p. Price: Microfilm - $1.00 - Photostat - $5.00
This report describes the use of the vehicle DUKW as a single unit and the use of groups of two and more DUKWs as vehicle and tank ferries and in ponton bridges. The vehicle DUKW-353 is designed for amphibious service. It has the automotive characteristics of a 6 x 6 conventional truck, and in addition it is equipped with an integral watertight hull designed in such a manner that truck chassis and drive units are attached to and in the body of the hull. For land operation the vehicle utilizes 6 driving wheels driven by the conventional 6-cylinder valve-in-head engine through transmission, transfer case and propeller shafts. For water operation, it is propelled with a water propeller, powered through transmission and a water propeller transfer case. It will accomodate approximately 25 men and equipment or 5,000 pounds pay load. A brief description and tabulated data on the vehicle, its engine and components are given. This is followed by a chart showing capacity of the various groups and combinations. Many drawings and photographs are included.

MARINE TRANSPORTATION

PB 15493. BESCHREIBUNG und betriebsvorschrift für einen Bb-motor in versus betriebsstellung. (Two fuel-system diagrams for the German submarine Diesel engine). (Supplement $16 to PB 15477). n.d. 2 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 23018. BOYD, ROBERT P. Analysis of noise in AAF eighty-five foot rescue boat no. R-447. (AAF ATSC Memo Rept TSEAC5-674-1-2). Apr 1946. 17 p. Price: Microfilm-50¢ - Photostat-$3.00
The results of noise level measurements made to determine the effectiveness of sound absorbing material installed in the above named rescue boats are presented in this report. Description of the test procedure and graphs and tables giving results of the tests are given. It was concluded that the sound level in the engine room was sufficiently high as to raise expectations of possible injury to the ears of personnel stationed therein and the noise level in the dispensary was barely tolerable. Treatment of the engine room by placing sound absorbing material on all available areas does not reduce the noise to a level considered desirable. The provision of efficient ear plugs, an acoustic enclosure in the engine room and the installation of sound absorbing materials on the walls, ceiling and forward bulkhead of the dispensary were recommended.

PB 23215, PB 23216 and PB 23217. DOW, R. P. and others. Annotated bibliography, subject index and summaries on shipbottom-fouling organisms and anti-fouling research. (OSRD Rept 1006). Sep 1942. Part I, Annotated bibliography, volumes 1 and 2, 335 p. Price: Microfilm-$3.50 - Photostat-$23.00. Part II, subject index, 174 p. Price: Microfilm-$2.00 - Photostat-$13.00. Part III, Summaries, 197 p. Price: Microfilm-$2.00 - Photostat-$14.00
The material presented in this report was compiled between December 1941 and September 1942, under the auspices of Harvard University, at the request of the National Defense Research Committee. The primary purpose of the work was to list the numerous and scattered unpublished reports made in previous years on shipbottom fouling and antifouling methods. It was further desired to locate and to abstract these reports in order that investigators in this field might not only be informed as to existing knowledge on the various aspects of the fouling problem, but also be guided quickly to the more pertinent papers. References to published articles on the biology of fouling organisms and on the biological and chemical aspects of fouling prevention are also included. Part I (PB 23215) of the present report consists of a bibliography of both the published and the unpublished literature, arranged alphabetically by authors. Following each reference, where feasible, a short statement is made as to the nature of the report and its application to the fouling problem. In cases in which a longer abstract seemed desirable, a separate summary was prepared, and these summaries have been brought together in Part III (PB 23217) of the report. Part II (PB 23217) comprises a subject index. Sources of material are given.

PB 23078. EISENBERG, P. Research and facilities of foreign model basins and related establishments. (U.S. Naval Tech Mission in Europe Tech Rept 535-45). Oct 1945. 77 p. Price: Microfilm-$1.00 - Photostat-$6.00
The research and facilities of model basins at Berlin, Vienna, and Wageningen, Holland, had not been extended beyond prewar installations, except for minor changes and planning which was in preliminary stages when the war came to an end. The Hamburg model basin, on the other hand, instituted programs in fields other than ship model and propeller research. The work of these establishments during the war and work which did not appear in publications available before the war are reviewed, and plans for expansion of these plants are revealed. In addition to the ship model basins considered, a description of the model basin of the Nachrichten Versuchsanstalt at Pelserhaken, which was constructed during the war for underwater acoustics research, is included. Also described are the circulating water channels of the J. M. Voith Maschinenfabriken, Heidenheim, and the Technische Hochschule, Berlin, with a brief review of the work undertaken in these facilities. The installations for tests of the air-water entry characteristics of torpedo models at the Blohm und Voss aircraft plant, Hamburg, are considered. This work was conducted with a catapult operating on compressed air for launching models into a free-surface transparent-wall tank. Photographs, drawings and a list of references are included.

PB 23081. HOPKINS, CHARLES A. German degaussing station at Waalhaven, Holland. (U.S. Naval Tech Mission in Europe Tech Rept 507-45). Oct 1945. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This investigation report contains a brief description of a German navy degaussing station located near Rotterdam, Holland, at pier number 8 on the Maas river. The station was built in 1941 by the electrical contracting firm of Rietschoten & Houbens of Rotterdam. Plans and specifications were made in Germany. Pier 8 previously built, was incorporated into the construction of the present structure. The degaussing circuits, and the method of degaussing are described briefly. The report contains a sketch plan, and a cross section sketch of the degaussing station as well as three photographs of pier and frame construction.

PB 23104. KUPP, L. A. Cavitation tunnels in foreign model basin and research institutions. (U.S. Naval Tech Mission in Europe Tech Rept 534-45). Sep 1945. 149 p. Price: Microfilm-$1.50 - Photostat-$10.00
This report discusses and describes the construction and design of cavitation tunnels for propeller investigation at research institutions at the following: Hamburgische Schiffbau Versuchsanstalt; Nederlandsche Scheepbouwkundig Proefstation, Wageningen; Kaiser Wilhelm Institut, Göttingen; J. M. Voith Maschinenfabriken, Heidenheim. Also discussed are the proposed cavitation tunnel at N.S.V.A., and the cavitation tunnels designed by N.S.V.A. for Russia, Japan, and Sweden. Some results of basic tests are also described. Graphs, tables, photographs, design drawings, diagrams and a bibliography of 11 items in German are included.

PB 23095. KUPP, L. A. Full scale ship trials in Germany. (U.S. Naval Tech Mission in Europe Tech Rept 525-45). Oct 1945. 34 p. Price: Microfilm-50¢ - Photostat-$3.00
Inspections for the acceptance of new German naval vessels and the conductance of full scale economy, endurance, tactical, maneuvering, and standardisation trials were under supervision of the Erprobungs Kommando für Kriegschiffneubauten, or the E.K.K., made up of naval officers and militarized technical officers. Standardisation, economy, and endurance trials were conducted for all new vessels, even in wartime. Trials were conducted principally in the Baltic Sea near Pillau, where the tides are negligible. In general, trial programs, which followed established procedures, were comparable in scope if not slightly more extensive than for U.S. naval vessels in wartime. Torsionmeters used in naval trials included the mechanical Pottinger type for some destroyers and small craft, the optical Frahm type for all large surface vessels, including some destroyers and torpedo boats, and the vibrating string Maihak type for destroyers, S boats, and other small craft. The use of the Pottinger meter was being abandoned and the Maihak meter was gaining in favor. An electrical inductance type MBC Heymann meter, built in a special short section of the shafting, was used for test stand trials of main machinery in some shipyards. Shafting calibrations for determining the torsional modulus were not conducted. Though thrustmeters were not generally used in naval trials, they were installed in various merchant vessels in the form of hydraulic pressure capsules installed permanently in Mitchell type thrust bearings. Another promising simple thrustmeter developed by Siemens used the magnetostriction principle in small gages also installed permanently in Mitchell type thrust bearings. The Kempf resistance type speed log was used for a few merchant ship trials, but its speed range was limited to speeds less than 14 knots because of cavitation and instability. The N.S.V.A. pressure type stem log was installed in most large naval vessels and some merchant ships, and has proved to be generally reliable and accurate. Graph, drawings and tables of trial data are included.

PB 23088. KUPP, L. A. Manufacture and design of propellers in Germany. (U.S. Naval Tech Mission in Europe Tech Rept 545-45). Oct 1945. 117 p. Price: Microfilm-$1.50 - Photostat-$8.00

This report covers the design of propellers for various types of German naval vessels, as developed and controlled by the Propeller Commission of OKM (German Navy Department) under Dr. Ing. Schmidt. It includes materials used, manufacturing methods and tolerances and propeller noise reduction, especially in submarines. The design of screw propellers and Voith Schneider propulsion are taken up. Design trends of OKM, and research and development projects of technical research institutions are summarized, together with an evaluation of various test methods. An appendix gives technical specifications for delivery of stainless steel rough castings for S-boats. A bibliography of 17 items in German is listed. Many photographs and drawings with design data are included.

PB 23623. HUST, CLAYTON A. German 4-cylinder gasoline outboard motor. Evaluation report. (Engineer Bd Registration 3269). Apr 1946. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This German outboard motor is powered by a 4-cylinder gasoline engine which drives a large propeller at a slow speed through a train of gears. It incorporates a reverse gear which is mounted in an outboard lower unit. The 4-cylinder, 33 HP, standard water-cooled engine has a bore of 75 mm. and a stroke of 104 mm. The motor operates at slow speed reaching a maximum of 2800 rpm. It runs well over its whole speed range and has excellent idling characteristics. The entire unit can be disassembled and placed on a dolly with wooden wheels and iron tires for handling on floors and hard surfaces. When shipping the unit, the dolly acts as a shipping container. Seven photographs are included in this brief report.

PB 23759. STEPHENS, RODERICK, JR. Model tests to investigate smooth water speeds of amphibious scout car. Interim report 1, Aug 8,- Sep 23, 1941. (OSRD Rept 222; QM Rept 4: 402). Sep 1941. 32 p. Price: Microfilm-50¢ - Photostat-$3.00
Tests conducted thus far indicate the feasibility of obtaining water speeds of between 7 and 8 m.p.h. utilizing present Willis quarter-ton 4 x 4 chassis fitted with watertight body which has the same basic road clearance, the same width and height, and somewhat greater overall length. The weight empty would be increased from 600 to 1200 lbs. over the standard vehicle, depending upon construction details. Tables, graphs, photographs and drawings are included.

PB 23767 and 23768. STEPHENS, RODERICK, JR. N.D.R.C. 2½ ton amphibian. Interim reports #4 and #5. Jul, Aug 1942. Each, 3 p. Price of each report: Microfilm-50¢ - Photostat-$1.00
These reports from Sparkman and Stephens Inc. cover progress in development of pilot model of amphibious vehicle. PB 23767 (Interim report #4) was largely devoted to testing various alterations on DUKW 001 (2½ ton pilot model). Such variations as could not be built into DUKW were tested in the Stevens Institute Model Basin. Such features as were considered satisfactory were released for construction of the 4 new pilot models (002, 003, 004, 005), and for engineering and tool design and construction for the production vehicle. Cooling tests were run on the original pilot model during the first week in August. From August 10 to 17, no. 1 job was rebuilt, being ready for final propeller and cooling tests on August 18. No. 2 was all but ready to run, and 3 and 4 were progressing rapidly. No. 5 was held back as all parts were to be production releases to check production engineering and to insure uniformity between no. 5 and production. PB 23768 also reports other developments and improvements in the vehicle including a system for supporting a sealed light tank in the water and a waterproof ignition system.

PB 15479. VERGLEICHENDE torsions-diagramme. (Four torsional vibration diagrams). (Supplement #1 to PB 15477, German Marine Diesel engine practice). n.d. 4 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 22929. VOGT, C. J. and ROSEN, C. G. A. Survey of Diesel engine development in Germany. (Naval Tech Mission in Europe Tech Rept 379-45). Sep 1945. 51 p. Price: Microfilm-$1.00 - Photostat-$4.00
A survey of German Diesel engine development suitable for Naval purposes, devotes much space to the work of Daimler-Benz and MAN because of their interest in skillfully designed engines of small cubical dimensions and low weight per h.p. developed for the German Navy. Dr. Kann of the Forschungsinstitut für Kraftfahrwesen und Fahrzeugmotoren an der Tech. Hochschule Stuttgart (FKFS) laboratories reported the following as promising new developments: (1) A 2-cycle sleeve valve engine designed by Dr. Voydt (2) a 2-cycle port scavenging engine designed by Mr. Riesaler, and (3) an air-cooled rotary disc valve engine being developed at Kirchheim. These engines are described. Developmental work at the laboratory and factory of Deutz at Cologne, Motorenfabrik Darmstadt A.G., Daimler-Benz at Untertürkheim, and MAN at Augsburg, are described. Developmental trends in performance and testing, supercharging, fuels, lubrication, cylinder liners and heads, pistons, rings and rods, connecting rods, fuel injection equipment, crankcases, bearings, crankshafts, and dampers are surveyed. Photographs, drawings, charts, tables, and a bibliography of 14 items are included.

WATER SUPPLY, SANITATION AND PUBLIC HEALTH

PB 23207. BUSWELL, A. M. Removal of salts from sea water. (OSRD Rept 106) Jun 1941. 59 p. Price: Microfilm-$1.00 - Photostat-$4.00
It was found possible to produce water of essentially zero mineral content by the use of the new types of resin exchange materials. The necessary filter beds and other equipment for a shipboard installation would weigh about one pound per gal/day. This is the same as the installed weight of the standard two-effect evaporators. The necessary auxiliary chemicals, however, would weigh 1.65 lbs. per gal., which must be compared with the 0.35 lbs. fuel oil per lb. distilled water required by the two-effect evaporator. It is concluded that the chemical methods studied cannot compete with two-effect evaporators for shipboard operation. It has been found that a treatment of sea water with hydrated barium hydroxide ($Ba(OH)_2.8H_2O$) followed by treatment with the resin exchange material IR-1 will produce water containing only 200 p.p.m. total mineral content. Since six pounds of water are produced from one pound of chemicals, this procedure is suggested as of possible value for use by landing parties, hydroplanes and lifeboats. Patent and literature references are included. This is a final report under contract with the University of Illinois.

PB 23208. EASTES, J. W. and MUELLER, E. R. Desalting of sea-water. (OSRD Rept 968) Oct 1942. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
The object of this project was to produce potable water from sea water through the use of synthetic resin ion exchangers. The results were not very favorable since it is estimated that to desalt 66 gallons (420 lbs.) of seawater to a potable level (1500 p.p.m. of total cations) would require a unit weighing 387 lbs. (206 lbs. resins, 132 lbs. water, 50 lbs. equipment) and occupying 6 cubic feet. This document consists of report one, dated Apr 8, 1942, and report two, dated May 1, 1942. This is a final report under contract with Resinous Products and Chemical Company.

PB 20839. KEHOE, ROBERT A. and CHOLAK, J. Methods for the purification of water after its transportation and storage in cans, drums, and tanks that have been employed as containers for leaded gasoline: Final report. (OSRD Rept 1139) Dec 1942. 37 p. Price: Microfilm-50¢ - Photostat-$3.00

The purpose of this study, made at the Kettering Laboratory of Applied Physiology, College of Medicine, University of Cincinnati, was to determine what operations are necessary to ensure the potability of drinking water when emergencies require the use of containers previously used for leaded gasoline. The containers considered were: 5 gallon cans, 50 gallon drums, tank-trucks, and tank-cars. The study was divided into two parts: I. Laboratory studies to determine the best means of removing lead and gasoline odor when present in drinking water, and II, methods for cleaning the containers and field studies with containers so cleaned. It was concluded that with the proper cleaning methods containers previously in leaded gasoline service may be used to store and transport drinking water, but such water may have to be chlorinated to insure its potability. Water stored for any length of time in iron tanks acquires some color and sediment, but these along with a slight odor and small quantities of lead may be removed by filtration through the mobile or portable army purification units. Gasoline odors and lead appreciably above permissible limits in drinking water can be removed satisfactorily, when necessary, by filtration through granular activated carbon beds or by treatment with powdered activated carbon. This treatment, however, will rarely be necessary if the containers have been properly cleaned and if storage of water in the containers does not extend beyond 40 hours.

PB 21120. TELKES, MARIA. Solar distiller for life rafts: Final report, May 1945. (OSRD Rept 5226). Jun 1945.
38 p. Price: Microfilm-50¢ - Photostat-$3.00
The development of solar stills for the production of drinking water from sea water is described. The inflatable floating vinylite still weighs approximately one pound and occupies a volume when packed of 80 cu. in. The distilled water produced corresponds to an efficiency of 50-60% of the incident solar energy, and amounts to about one quart during an average tropical or clear summer day. Photographs, diagrams and graphs. This report is from the Massachusetts Institute of Technology.

MISCELLANEOUS

British

PB 22494. URSELL, F. An optical device for deducing the pressure due to low waves given a continuous time record of the surface elevation. (United Kingdom Admiralty Res Lab Rept 103.15 R.4 W) Nov 1945. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
In the plan proposed here, the elevation of the water surface above a fixed point is recorded continuously as a black trace of variable width on transparent film, as shown in an illustration accompanying the report. This film is illuminated by a band of light produced by a mask of variable density and the total quantity of transmitted light is measured by a photocell. The density distribution in the mask can be so arranged that the quantity of light received by the photocell is a measure of the wave pressure at any desired depth below the surface. The proposed arrangement using a film projector is also illustrated. The device can be used on a record of surface elevation which is the interference pattern between wave trains of many different periods. Thus it provides a means of comparing records of the pressure and surface elevation of sea waves and of finding out whether these quantities are related in the manner prescribed by hydrodynamical theory.

French

PB 23746. BRIGHT, R. H. Tank targets visited in Paris area. (CIOS File XIV-5, Item 18) Dec 1944.
24 p. Price: Microfilm-50¢ - Photostat-$2.00
This report records results of visits which were made to clear up some miscellaneous matters relating to German tank construction and manufacture. Specification of material used for torsion bars by Electro-Forge is given. A translation of a paper on a method of high frequency ignition appears in the appendix. This is entitled "Battery ignition with discharge from a condenser" by E. Seiler. A copy of a direction upon the use and specification of alloy structural steels, dated Jun 19, 1942 also appears in the appendix. This material was obtained from the commercial manager of Electro-Forge.

German

PB 19421. ACKERMANN, ILSE. Elektronendurchlässige glashäute. (Electron permeable glass foil). Reichsforschungsrat (ALSOS Mission, RFR 507 1). Oct 1944.
2 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a summary of studies made at the technical college of Danzig as part of the problem: Elektroneninterferenzuntersuchungen an festkörpern (electron interference on solid bodies). Subject report refers to the examination of foils out of thüringer (optical) and SiO_2 (common) glass exposed to an electron irradiation then heated up to 800°C. and examined with an ultra microscope for pores and structural damages.

PB 23388. BASSETT, EDWARD O. Industrial sales, output, and productivity prewar area of Germany 1939-44. (Strategic Bombing Survey Special Paper 8) Mar 1946.
69 p. Price: Microfilm-$1.00 - Photostat-$5.00
In the absence of any German index of the physical volume of industrial production during the war a physical-production series for the war period has been prepared from the data available. These deal for the most part with munitions and related products and do not afford comprehensive coverage in other fields. Moreover the constantly shifting boundaries of Germany leads to a certain lack of consistency in the measurement of industrial efficiency. This study is confined to the industry of the prewar area, comprising the territories of the Reich (including Austria and Sudetenland) at the outset of the war. In the absence of a more suitable index of industrial production, German wartime industrial activity has been measured in terms of industrial sales. The Germans based their estimates of industrial sales, as well as industrial employment, on industrial reports which constituted a virtual census with approximately 90 percent coverage of industry, until the disruptive effects of Allied bombing necessitated the use of smaller, but still sizable, samples beginning in 1944. German industrial data represent all mining, manufacturing, and construction enterprises, except those classified as handwork - generally small, unincorporated, unmechanized, and quantitatively important only in industrial fields, for example in construction, where such enterprises predominated. These industrial sales have been adjusted for price changes in order to indicate approximately the physical volume of output. An approximate measurement of industrial production for the German armed forces has been made. Labor input has been compared with deflated sales, to trace the course of productivity in German industry during the war. The following are some of the tables included: Industrial sales in current prices, prewar area of Germany, 1939-44; Changes in sales of industry groups showing over 20-percent increase in sales from 1939 to the first half of 1944; Indexes of industrial production and construction, 1939-1944; Sales and wage earner employment of government-owned armament enterprises, 1942-44; Indexes of labor productivity in industry, 1939-1944.

PB 19428. BIEHMANN, L. Wellenfunktionen einer anzahl gebundener und freier zustände des leuchtelektrons für Al I, Mg II und Si II. (Wave functions of a number of free and bound photons for Al I, Mg II and Si II). Reichsforschungsrat (ALSOS Mission, RFR 507 3). Jul 1944.
12 p. Price: Microfilm-50¢ - Photostat-$1.00
This publication represents the fourth preliminary communication as a supplement to reports in the magazine for "Astrophysik" vol. 22, 2-3, 1943 and contains tabulations of subject functional values. In German.

PB 23192. BUCH, JOHN W. Activities of the Westfalische Berggewerkschaftskasse during wartime - Bochum, Herner Strasse 45. (CIOS File XXX-41, Item 30) 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
The Westfalische Berggewerkschaftskasse continued with little interruption until late in 1944. Since that time the testing and research work has been limited as a result of the 60% damage of the buildings and their contents by bombing. The courses of instruction did not differ greatly from those of American institutions except in regard to mine policy, industrial policy, and legislation relating to insurance and political economy. Special developments of possible interest to Americans were an anemometer, capable of registering an air flow of 1 foot per minute or less, and an electric mine lamp containing an air-motored 6 volt electric generator.

PB 19495. DRAWINGS of boilers of German destroyers T22-36 and Z31-36. n. d. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
This report contains the following drawings of boilers of German destroyers: (1) Cross section of a boiler; (2) side view and section of a boiler; (3) superheater; (4) gas flue and preheater for feed water; (5) air preheater; (6) two schematic views of boiler; (7) front view and side section of a boiler; (8) cross section of a boiler; (9) various clamps for fire-brick; (10) cross section of a super-heater; (11) arrangement of the preheater for air and control valve. Each drawing is accompanied by a list of parts. Text on drawings in German.

PB 22807. FISHER, S. P. "Schwingmetall" - A process for bonding rubber to steel used primarily for mountings to eliminate vibration. (Naval Tech Mission in Europe Tech Rept 250-45) Sep 1945. 46 p. Price: Microfilm-50¢ - Photostat-$4.00
"Schwingmetall" is a trade name of Continental Caoutchouc-Compagnie, Hanover, Germany, and refers to a process of attaching soft rubber to metal (mostly steels) used primarily for the elimination of vibration in machinery mountings. Usually the soft rubber is between two pieces of metal - one side of which is attached to the foundation and the other to the machinery. This method of suspension could be used in mountings for compression, tension and torque. These mountings were used extensively in German submarines to eliminate sound. This method is not entirely new but it was thought desirable to record German technique and rubber formulations. The report gives in detail information on preparation of metal for plating and cement used for natural rubber and synthetic rubber, vulcanization data, tests, and rubber compound formulations. There is included a booklet by Continental Caoutchouc Co. which describes in detail why "Schwingmetall" should be used, how to prepare the metal, and by numerous tables and drawings illustrate where and how installations should be made. Pages 14, 15, and 16 of this booklet are missing.

PB 18495. GERMANY. DEUTSCHER NORMENAUSSCHUSS. German standards of nonferrous metals. (MIS VII 69c 7001537) n.d. 42 p. Price: Microfilm-50¢ - Photostat-$3.00
This material consists of forty one sheets listing German standards for nonferrous metals as follows: White metal, bronze and red brass, pewter tin, copper, brass, silver solder, hard solder, pure aluminum, pure aluminum semi-finished, alluminum alloy, lead bronze, magnesium alloy, magnesium die casting alloy, lead die casting alloy, aluminum die casting alloy, and light metal die casting alloy.

PB 20461. GERMANY. KAISER WILHELM GESELLSCHAFT ZUR FÖRDERUNG DER WISSENSCHAFTEN. Senat und diesbezügl. schriftwechsel (Activity reports of the Senate, Kaiser Wilhelm Gesellschaft). (ALSOS Mission, RFR 463). n.d. 169 p. Price: Microfilm-$2.00 - Photostat-$12.00
This file contains the records of the annual meetings of the Senate of Kaiser Wilhelm-Gesellschaft Berlin, covering special research work on forestry, biology oceanography, metallurgy, coal mining, physical chemistry, electrochemistry; physics; silicates; anthropology; breeding of animals, cultivation of plants, especially fiber grass, bast and flax. The research institutes on "Kunst und Kultur" in Rome; the German-Italian institute on oceanic biology at Rovigno d'Istria, the German-Greek institute on biology in Athens and the German-Bulgarian institute on agriculture in Sofia and their activities are described in records from 1937 to 1943.

PB 20453. GERMANY. REICHSFORSCHUNGSRAT. Allgemeiner schriftwechsel der Kaiser Wilhelm Gesellschaft, Berlin (2. band ab 1. Jan. 1933-1943). (General correspondence of the Kaiser Wilhelm Gesellschaft, Berlin (Vol. 2 from January 1933 to 1943)). (ALSOS Mission, RFR 461). Jan 1933 - Dec 1943. 392 p. Price: Microfilm-$4.00 - Photostat-$27.00
This file contains a complete list, dated November 9, 1943, of those research institutes of the Kaiser Wilhelm Gesellschaft, Berlin, which were transplanted during the war to districts less endangered by air raids. Their new locations all over Germany are described in full detail. A list of the names and addresses of the members and personnel of the KWG is included and also those for the branch institutes of the Kaiser Wilhelm Gesellschaft in Greece, Bulgaria and Italy. Besides secret correspondence with Army and Navy, the file contains a copy of "Facts in Review", March 11, 1940, published by the German Library of Information, New York, on the atom smasher, a device developed at the Kaiser Wilhelm Institute, Berlin. An interesting correspondence between Professor Planck as president of the KWG and the national socialist minister of education, Rust on the planned commemoration for Prof. Fritz Haber is also included.

PB 18761. GERMANY. REICHSFORSCHUNGSRAT. Annual financial reports of the RFR and its departments. (ALSOS Mission, RFR 492). Apr 1938 - Jun 1944. 857 p. Price: Microfilm-$9.00 - Photostat-$58.00
The annual financial reports of the Reichsforschungsrat (RFR) to the Ministry for Science and Education show that the RFR in 1943 received a subvention of 50 million Reichsmarks for special tasks in connection with the war effort. The financial reports include the years 1938-1943 and the objections to them made by the Rechnungshof (similar to U.S. Comptroller General) in Potsdam. The reply of the RFR to these objections emphasizes that the amount of salaries and scholarships should be maintained, because otherwise the research workers would leave for industrial jobs at higher salaries than those in research institutes. Full detail of all scientific activities of the RFR is given.

PB 20457. GERMANY. REICHSFORSCHUNGSRAT. Reichsforschungsrat akte I. Fachsparte eisen und stahl. (General correspondence and personnel administration of iron and steel section). (ALSOS Mission, RFR 465). Mar 1943-Jan 1945. 405 p. Price: Microfilm-$4.50 - Photostat-$27.00
This file contains among more specific correspondence a general report on the U.S. Army and Navy newest inventions for the war effort compiled by Geist (presumably Colonel Geist from the German High Command of the Army) from OSRD reports. The compilation was ordered by the German High Command of the Navy (Kriegsmarine) and was distributed to the Reichsforschungsrat for confidential information. A list of trusted persons (vertrauensleute) attached to the Reichsforschungsrat, a detailed circular note on TWA (Technische und Wirtschaftliche Weltfachpresse) Hamburg, a new statute on intellectual property as submitted to the members of Reichsforschungsrat for review and a detailed instruction for censorship of scientific publications are included. A list of research workers for the occupied East Territories is also included and the appointment of Professor Fry, Berlin, as head of metallurgical research in the occupied East is mentioned. Organization of the Reichsforschungsrat with Reichsminister Speer, Generalfeldmarschall Milch, Bormann, Funk, Ohnesorge, Rust, Rosenberg, General Colonel Fromm, Körner, Backe, Conti, Vögler, General of Artillery Leeb, Schwerin-Krosigk, Prof. Brandt and Reichsführer- SS Himmler is given in full detail. Graphic synopsis of the iron and steel section is added and the complete list of the research workers in this section is included.

PB 20482. GERMANY. REICHSFORSCHUNGSRAT. RF IV Planungsamt Prof. Osenberg (Correspondence of the director of the planning office). (ALSOS Mission, RFR 456). 1943-1944. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
The director of the planning office, Prof. Osenberg, Northeim (Hanover) had inquired by circular of the heads of the metallurgical research institutes which scientific periodicals in Germany could be discontinued and which ones must be continued. The various answers to this inquiry are collected in this file.

PB 18749. GERMANY. REICHSFORSCHUNGSRAT. RFR. (General administrative correspondence.) (ALSOS Mission, Gerlach 14). 1943-1945. 110 p. Price: Microfilm-$1.50 - Photostat-$8.00
This file contains the Hitler decree of July 16, 1944, and the explanatory decree by Minister Speer of Jul 20, 1944, on the concentration of German arrangement production giving all details and the complete personnel set up. An article by Leland H. Taylor of the University of California on the "Science Mobilization Bill", published in the periodical, "Science", Vol. 98, no. 2532 of Dec 26, 1943, is added. Also included is a list of about 50 Dutch war prisoners (mostly students) who were employed in German scientific institutes; full details are given. The correspondence between RFR, Berlin, and the Institute for Physics (Prof. Gerlach) in Munich contains a statute for the establishment of an arbitration board to settle controversies on intellectual property (patents etc.). A short guide explaining how the individual research worker has to cooperate with the RFR by submitting his theories to the RFR and how he obtains the funds he needs to continue his work, is added.

PB 18277. I. G. FARBENINDUSTRIE, ELBERFELD. Equipment drawings. (MIS VII 67g 7003035). 1940-1941. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
These drawings by the I. G. Farbenindustrie A.G. include the following: 1. Five drawings and flow sheets dealing with installation of catalyst plants including a catalyst reduction installation; one drawing is plan of their film factory Wolfen; one drawing is a plan of their factory at Elberfeld; and two drawings are plans of the North and South factory at Bitterfeld, Germany. Several drawings listed as belonging to the catalyst plant installations are not included.

PB 22832. PRENTICE, T. M. German camouflage. (Naval Tech Mission in Europe Tech Rept 317-45) Sep 1945. 33 p. Price: Microfilm-50¢ - Photostat-$3.00
This report discusses German camouflage of shore installations, both industrial and military, under the following headings: Site planning, dispersal, structural camouflage, applied camouflage, dummy structures, miscellaneous methods and materials. A description of the materials used and the methods of erection are given in the section devoted to applied camouflage. Examples are cited to illustrate the German attitude toward camouflage before and during the war and an appraisal is given of the measure of success achieved. Photographs are included.

PB 25661. RANKINE, A. O. Developments of geophysical prospecting in Germany during the war. (BIOS Final Rept 234, Item 30) Sep 1945. 6 p. Price: Microfilm-$1.00 - Photostat-$1.00
The aim of the author and his two associates who visited the British Zone of Germany in the fall of 1945 on behalf of the British Ministry of Fuel and Power, was to locate examples of the most recent geophysical instruments, and to find and interrogate the inventors, makers and users respecting the design, operation and performance of the said instruments. No instruments were found which were superior to those made in the United States or Great Britain, but some information is given under the headings: (1) The measurement of gravity (an evaluation of the Thyssen and the later Graf gravimeters is given); (2) seismic investigations-apparatus for refraction and reflection shooting; (3) instruments for electrical prospecting; (4) magnetic measurements - magnetometers (improvements had been made in rendering the performance of Schmidt vertical and horizontal magnetic variometers independent of fluctuations of temperature), and (5) the compilation of geophysical data in Germany. Practically the whole country and some neighboring occupied countries were surveyed in great detail gravitationally by various forms of gravimeter, and seismically by means of refraction fan shooting on radii about 4 kilometers in length. The results were in the course of compilation by continuation of the work of the Reichsamt fur Bodan Forschung and complete maps of these two types were to be made available.

PB 22811. SCANLAN, EMMETT A. and HITCHCOCK, H. RENNER. Mechanical foam liquid and equipment. (Naval Tech Mission in Europe Tech Rept 279-45) Sep 1945. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
This report discusses the improvements which were made in mechanical foam liquid and equipment as a result of the work done by the technical committee of the German association of Fire Protection Engineers. Foam liquids, nozzles, proportioners and low pressure equipment are discussed. Bibliography and list of materials shipped to the U. S. for examination and tests are listed in the appendix. Diagrams are included.

PB 19433. SINGER, OTTO. Oszillatorenstärken. (Oscillator strength). Reichsforschungsrat (ALSOS Mission, RFR 507 47). Apr 1944. 1 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a summary of the present status of studies conducted on "wehrmachtsauftragsnummer" (contract of the German armed forces) S 4891 - 5454 810/4 - III/43 with the subject code word and refers to examination of brightness of the third order. In German.

PB 23349. U. S. STRATEGIC BOMBING SURVEY. The economic effects of the air offensive against German cities. (Rept 31) Oct 1945. 57 p. Price: Microfilm-$1.00 Photostat-$4.00
This report attempts to measure the effects of city area attacks upon Germany's productive power. It examines the extent and causes of production loss resulting from attacks. It does not consider the extent to which city attacks may have influenced the morale of the German people or have affected the shape of their future political thinking. This particular volume is an analysis of the nature and extent of the production loss imposed by area attacks. The conclusions in the report are based upon the following: (1) intensive field study of nine heavily bombed cities; (2) an analysis of 8,500 questionnaires received from the officials of industrial plants in 50 German cities; and (3) interrogation of German governmental and municipal officials and industrial plant managers and examination of German ministerial records. A city area attack is defined as a raid directed at a city as a target by more than 100 bombers with a weight in excess of 100 tons which destroyed more than two per cent of the residential buildings in the city. In the period between October 1939 and May 1945, the RAF together with the 8th and 15th Air Forces dropped 372,714 tons of high explosive, 168,671 tons of incendiary, and 1,169 tons of fragmentation bombs in raids specifically directed against 61 German cities with a population of 100,000 or more. City attacks destroyed approximately 2,150,000 dwellings (11% of all the dwellings in the Reich) rendered homeless 7,500,000 people, killed 250,000 people, and injured 420,000. The complete record of attacks against these cities is presented in a table. The industrial loss resulting from these attacks is classified as direct production loss (resulting from interference with production due to labor absenteeism and from damage to factories and machines) and indirect production loss (resulting from the diversion of labor and productive machinery to the repair and replacement of industrial buildings, plants, inventories, dwellings, and household goods.) Data are presented in tables and graphs. For a group of ten cities economic effects are shown by tabulating the tons dropped, giving

the index of intensity, the production loss in city months, and the period required for recovery in months. The amount of absenteeism following area raids is tabulated. The loss of production in individual plants is divided by loss due to plant damage and loss due to absenteeism. In tabulating the cost of repair and replacement in city months material is presented under the following headings: Buildings, machines, and raw materials; household goods; houses. Although attacks against city areas resulted in an overall production loss estimated at roughly 9% in 1943 and perhaps as much as 17% in 1944, this loss did not have a decisive effect upon the ability of the German nation to produce war material. The loss imposed was of a kind which could be absorbed by sectors of the German economy not essential to war production, while the indirect loss fell on industries easily able to bear the burden. An area raid drove down production in a city by as much as 55% in the month immediately following the attack. Recovery was rapid, however, and most cities attained 80% of normal within three months and complete recovery within six to eleven months. A series of graphs is appended to the report. Appendix A, following the graphs, describes the method devised for appraising the economic value of German cities. This appraisal, known as the "key point system" was to determine the most profitable economic targets for strategic effect by concentrated night attack against the built-up area of the city.

PB 23347. U. S. STRATEGIC BOMBING SURVEY. Economic effects of the air offensive against German cities: A brief study of the effects of area bombing on Berlin, Augsburg, Bochum, Leipzig, Hagen, Dortmund, Oberhausen, Schweinfurt and Bremen. (Rept 39; Area Studies Div Rept 8) Oct 1945. 146 p. Price: Microfilm-$1.50 - Photostat-$10.00

This report contains a brief study of the effects of area raids on Berlin and a series of exhibits showing the impact of area raids on industrial production in Augsburg, Bochum, Leipzig, Hagen, Dortmund, Oberhausen, Schweinfurt and Bremen. These exhibits are accompanied by charts on production and electrical consumption and maps indicating land use zones and physical damage areas. According to statistics obtained from the War Damage Office, the value of all damage caused by air raids on Berlin amounted to over 43 billion reichmarks. Approximately one-fourth of this figure was for damage to buildings and three-fourths for material damage. Total industrial property damage in Berlin was valued at 30.5 billion Reichmarks, as compared with 12.7 billion Reichmarks damage to dwellings and public buildings including furnishings, household goods, clothing, etc., stored or installed in these buildings. Sections of this report contain the following headings: I. General description of Berlin; II. Attack data; III. Air raid damage; IV. Population and evacuation; V. Coal; VI. Gas; VII. Water; VIII. Electricity; IX. Transportation (railroad); X. Transportation (inter-urban); XI. Finance; XII. Labor; XIII. Wholesale and retail trade; XIV. Industrial production. Exhibits.

PB 23350. U. S. STRATEGIC BOMBING SURVEY. Economic effects of the air offensive against German cities: A detailed study of the effects of area bombing on Hamburg, Germany. (Rept 32; Area Studies Div Rept 1) Nov 1945. 102 p. Price: Microfilm-$1.50 - Photostat-$7.00

The primary purpose of this study was to determine the economic effects of the area raids of July-August 1943 on the city of Hamburg, Germany. An attempt was also made to compare the relative effects of area raids on the city as a whole as compared with precision attacks on specific targets and on industrial areas, and to measure the indirect effects of bombing on damaged as compared with undamaged plants. The area raids of mid-1943 caused a loss of 1.8 months of the city's industrial production and although industry as a whole was able to attain production of slightly more than 82 percent of normal capacity during the last four months of that year, the unrecovered loss was still more than 11 percent. The population of the city was reduced by these raids from 1,500,000 to 850,000 with great loss in the labor force; 35,000 of 121,000 houses in the city were destroyed; and 48 percent of the industrial and commercial buildings were destroyed. From a study of all factors of production and interrogation of industrialists in Hamburg, it was apparent that neither the area raids directed against entire sections of the city, nor precision bombing on specific industrial targets, were as effective in disrupting the enemy's ability to wage war as the destruction of transportation facilities in general throughout the industrial regions of the country. Detailed information is given in this report under the following headings: I) Summary and conclusions; II) the city as a target; III) the air offensive against the city; IV) physical effects of bombing; V) recuperation from raids; VI) effects of raids on industrial and commerical activities; VII) effects of raids on labor supply; VIII) effects of area raids on industrial production and on various classifications of industry such as machinery, metal production and fabrication, shipbuilding, oil, chemicals, textiles, food processing, etc. Graphs and bar charts show activities in various industries from January 1942 to March 1945. Many tables of data are included. Two maps and an appendix giving data on precision attacks accompany this report.

PB 23344. U. S. STRATEGIC BOMBING SURVEY. The effect of strategic bombing on the German war economy. (Rept 3) Oct 1945. 286 p. Available from Supt. of Docs., Washington 25, DC, price $1.00

This report is a single over-all account of the effects of strategic bombing on the German economy. In reviewing the history and changing scope of the Allied air offensive against Germany the following considerations must be kept in mind: (1) The increase in the weight of attack that could be brought against the enemy; (2) the improvements in operational techniques; and (3) the manner in which choice of targets was influenced by the requirements of the immediate military situation. The detailed bombing pattern and the characteristics of the following four phases of the air war are given in this report: (1) The early period (until the end of 1942); (2) the period of limited capabilities (January 1943-February 1944); (3) the aircraft period (February-June 1944); and (4) the period of full-scale offensive (July 1944-April 1945). The average monthly delivery of bombs increased from 1,128 tons in 1940 to 170,000 tons in 1945. The development of the P-51 long range fighter provided for attacks deep in the heart of Germany. Radio direction devices rendered possible precision bombing through clouds and at night. First the submarine threat and later the danger from Germany's fighter force made it advisable to concentrate on submarine and aircraft industries even though other targets may have promised better results. Germany's output of armaments was surprisingly low during the first three years of war. She was not preparing for a long war. When Speer became Minister of Armament Production in 1942 he began increasing production but Germany never reached her full war potential. Germany had adequate machine tools, general machinery, and plant facilities. The total employment of Germans and the proportion of men employed remained about the same throughout the war. Prior to the summer of 1943 air raids had little appreciable effect on German munitions production or on the national output in general. In the latter part of 1943 loss of German armament output from raids is estimated at 5%. Losses increased as raids increased. The attack on oil was concentrated against Germany's synthetic plants. From December 1944 onward all sectors of the German economy were in rapid decline. Chapters following the summary chapter are devoted to: (2) German war economy in perspective; (3) the supply and use of labor; (4) the supply and use of capital equipment; (5) the construction industry; (6) basic materials; (7) civilian supply; and (8) German armament production. A bibliography gives references for chapters 3 to 8. The appendix consists of 115 statistical tables. There are additional tables, charts and graphs in the main body of the report.

PB 23352. U. S. STRATEGIC BOMBING SURVEY. Effects of area bombing on German cities: A detailed study of the effects of area bombing on Düsseldorf, Germany. (Rept 34; Area Studies Div Rept 3) Oct 1945. 89 p. Price: Microfilm-$1.00 - Photostat-$4.00

This report states that from the study of Düsseldorf detailed here it must be concluded that area raids, as they were planned and executed against this city, did not and probably could not permanently cripple the economic acitivities of the community nor seriously affect for long the industrial production of its plants. However, as the production of goods vital to the German economy would normally be expected to rise during the war years, any decline however small or even a mere maintenance of capacity, might be interpreted as unfavorable in a study of Düsseldorf's contribution to Germany's war effort. But even that effect could not be attributed solely to air raids directed against this city alone. It is evident that only by continuous attacks upon the other sections of the entire Ruhr districts, which served Düsseldorf both as customers and suppliers, was the city finally brought to the point of economic exhaustion. Sections of this report are headed, as follows: I. Summary and conclusions; II. general description of city; III. attack data; IV. direct effects of bombing; V. economic consequences; VI. labor force; VII. production. Appendix I, an analysis of standard German employee reports contains tables giving data on situation of labor forces after Nov. 2, 1944 raid, comparison of productive hours and lost hours for July 1944, and comparison of productive hours and hours lost in industrial firms, Düsseldorf. Appendix II consists of maps showing land use zones and physical damage. Graphs are also included.

United States

PB 19805. ABRAMS, M. H. and others. Speech in noise: A study of the factors determining its intelligibility. (OSRD Rept 4023; NDRC Res on Sound Control Informal Communication 54, 60, 67, 69, 74, 81; NDRC Rept 17.3:103). Sep 1944. 183 p. Price: Microfilm-$2.00 - Photostat-$11.00

This report from the Psycho-Acoustic Laboratory, Harvard University, consists of six informal communications, five of which have been previously published and distributed individually. The sixth and largest study is here presented for the first time. The separate communications making up this report are, as follows: IC-54, The effect of microphone position on the intelligibility of speech in noise, Dec 6, 1943. This communication emphasizes the necessity of holding hand microphones directly in front of and in contact with the lips in order to obtain maximum efficiency under noisy conditions; also, speakers in Naval Aviation using the T-38 microphone are advised to avoid tipping the microphone too far out of vertical position. IC-60, Factors related to the intelligibility of talkers in noise, Feb 1, 1944. This report presents the results of several experiments on the relative intelligibility of talkers using standard military interphone equipment in a noisy environment. IC-67, Subjective ratings of the intelligibility of talkers in noise, Apr 10, 1944. This report describes a number of articulation tests that were conducted, and their results. Incidentally to the main purpose of these experiments, analyses were made of the relations between the intelligibility scores and the scores derived from three types of subjective ratings of the same talkers. The results of these analyses offer preliminary evidence concerning the validity of subjective ratings of efficiency in communication. IC-69, The use of words and sentences in testing the intelligibility of telephone talkers, Apr 17, 1944. This report describes 68 lists of 20 complete sentences and 11 lists of 100 single words developed specifically to test the intelligibility of talkers in noise. Since the lists of single words are soon to be replaced in this laboratory by a set of phonetically balanced word lists of wider utility, only the sentence lists are reproduced in this report. IC-74, The effect of voice intensity on the output voltage of various microphones, Jun 1, 1944. This report states that, since military microphones are sometimes employed to measure or monitor the intensity of the voice used in interphone or radio communication, it is of interest to determine to what extent the voltage generated by these microphones is directly proportional to voice level. Experiment described herein was designed to test the linearity of various microphones as a function of voice intensities ranging from a whisper to a shout. IC-81, Speech in noise: A study of the attributes determining its intelligibility, Sep 1, 1944. This research represents an attempt to discover and analyze the attributes of speech which determine its relative intelligibility in the presence of loud ambient noise. Methods of testing and recording the voices of talkers are described. Individual differences in voice intensity, and pitch, as well as the relation of the ratings to the intelligibility scores, and thresholds of detectability and intelligibility, are discussed. Tables and graphs are included.

PB 22860. BLACKWELL, H. RICHARD. Laboratory studies of the visibility of targets. n. d. 25 p. Price: Microfilm-50¢ - Photostat-$2.00

As a portion of the program of the Camouflage Section of the National Defense Research Council, experiments were conducted at the Tiffany Foundation, Oyster Bay, New York, to establish the human capacity for visual detection. The experiments were designed to simulate field conditions with provision for precise control over the variables known to be revelent. It was desired that visual functions be quantified so that the capacity of the human observer could be treated as one of the known variables contributing to the visibility of targets. The experiments reported cover a wide range of experimental conditions. Field brightnesses were investigated ranging from 100 footlamberts to total darkness. Target sizes were studied ranging from 360 to 0.6 minutes of arc. Shapes were investigated from circles to 100:1 rectangles. Exposures were tested from six-seconds to an indefinitely long time and studies of targets both brighter and darker than the background were made. More than two million observations of targets were made under laboratory conditions. The results of the tests are discussed and presented in the form of plotted curves.

PB 22882. BYRING, CARL F. Jungle acoustics. Feb 1945. 33 p. Price: Microfilm-50¢ - Photostat-$3.00

This paper is the report of part of the work undertaken by the College of Engineering, Rutgers University, under contract with OSRD. The field work was conducted in the Canal Zone. The complete report of the project has been published as OSRD Report 4699 (PB 13102) Feb 15, 1945, and OSRD Report 4704 (PB 13101) Feb 17, 1945 (see page 823 and 824 respectively). The problems investigated and covered by this paper are: The sound transmission loss through the jungle of the audible frequencies; the sound spectrogram of characteristic ambient jungle noise; and the error involved in judging sound direction in a jungle. Procedures and apparatus used in measurement are described. Temperature and wind profiles, frequency curves, photograph of jungle and tables of data are included.

PB 22149. LONG, E. K. [illegible]os-bearing filter papers. (CWS Tech Div Memo Rept 301) [illegible]ul 1941. 12 p. Price: Microfilm-50¢ - Photostat-$1.00

The report describes experiments to evaluate certain samples of filter material containing asbestos fiber, in terms of DM (diphenylaminechlorarsine) and DA (diphenylchlorarsine) smoke penetration and in comparison with material normally used in the manufacture of service canisters. The preliminary results indicate that the filters containing small amounts of asbestos are superior to ordinary filters. It was recommended that additional experiments be conducted to determine the optimum proportions of asbestos and cellulosic fiber. This typewritten document may not reproduce well.

PB 25567. ROCKWELL, P. O. Canister testing. (Edgewood Arsenal Chemical Div Rept 233) Dec 1922. 14 p. Price: Microfilm-$1.00 - Photostat-$1.00

The serviceability of gas mask canisters after their production, storage or use is found by determining on a small representative portion of a lot, the protection afforded against chloropicrin and phosgene, and the resistance to air flow. The service times against these two gases serve to evaluate both the charcoal and the soda lime in the canister. Complete instructions for carrying out the above tests with descriptions and drawings of the necessary apparatus are included in this report. The report also contains requirements for canisters to be used for actual service or training purposes.

PB 22585. BOSS, D. A. and others. Articulation tests of A-14 and XA-13 oxygen masks at sea level and at 35,000 feet. (NDRC Res on Sound Control Informal Communication 5) Jun 1944. 11 p. Price: Microfilm-50¢ - Photostat-$1.00

In its report on subject tests, the Psycho-Acoustic Laboratory, Research on Sound Control, Harvard University, stated that the continued development of military aircraft capable of operating at high altitudes has required improvements in the oxygen equipment that the crew must use during a high-altitude mission. Among this equipment, the oxygen masks are of particular importance to the problem of communication. In subject tests the announcer attempted to maintain constant speaking effort, at sea level and at a simulated altitude of 35,000 feet. Curves were obtained showing the relation between percent word articulation and interphone voltage gain. In comparison with the A-14 mask, the XA-13 was found to be deficient in sensitivity and in its ability to transmit speech at high altitudes. For roughly comparable high-altitude performance, both masks require 15 to 20 db of interphone gain above their respective requirements at sea level. The two masks were found to react somewhat differently to the two voices used in the tests. Procedure and results are described. The arrangement of interphone equipment with the listening crew is shown in an illustrative diagram.

PB 19820. HUDMOER, H. W. and others. Effects of high altitude on the human voice. (OSRD Rept 3106; NDRC Rept 17.3:62). Jan 1944. 114 p. Price: Microfilm-$1.50-Photostat-$8.00

The material presented in this report from Cruft Laboratory, Harvard University, is based on data collected over a period of six months. During this time more than seven thousand voice analyses were made on eleven speakers. It was found that the acoustic response of the voice-oxygen mask combination at altitude relative to its sea level response is largely independent of the choice of the mask. This fact should not be construed as meaning that the voice sounds the same or has the same intelligibility at altitude regardless of what mask the speaker wears. It means that the radio of his output at altitude to his output at sea level is essentially the same for all masks. It was also concluded that speech energy varies uniformly with altitude. The decibels change in each frequency band between altitudes H_1 and H_2 is approximately proportional to $\log_{10} \left[\frac{\text{air density at } H_1}{\text{air density at } H_2}\right]$

Intelligible speech can be produced by the voice at an altitude of 45,000 feet. Three subsidiary problems were studied in the course of the experiments on voice changes. Band frequency calibrations of oxygen masks were obtained using the human voice as the sound source. The same techniques were applied to a carbon throat microphone, whose altitude characteristics have also been investigated. Finally, the threshold of hearing at 35,000 feet has been measured in an attempt to determine whether the acuity of hearing decreases at high altitude. This report states that the threshold of hearing is independent of altitude, and that the shift in threshold at 35,000 feet for the average of repeated tests on fifteen ears is within ± 2.5 db. A brief description of apparatus, with photographs, is presented. Tables, graphs and circuit diagrams are also included.

PB 22283. SILVER, S. D. Constant flow gassing chambers: Principles influencing design and operation. n. d. 19 p. Price: Microfilm-50¢ - Photostat-$2.00

A dynamic (or constant flow) chamber is one through which air is continuously drawn at a fixed rate. Experimental data are given from which it is concluded that various specific, and listed, factors are influenced by the following aspects of the chambers: Airflow through the chamber; size, shape and interior surface of the chamber; relative areas of inlet and door opening; and species and size of the animals. This typewritten report is from the Medical Division, Edgewood Arsenal. Bibliography.

PB 21170. U. S. FRANKFORD ARSENAL, PA. On the analysis of variance. n. d. 9 p. Price: Microfilm-50¢ - Photostat-$1.00

When conducting routine tests, the inspector or proof officer desires to assure himself that a series of results obtained with the reference rounds belong to a single universe, i.e., that the results exhibit statistical control. When conducting experimental and development tests, the engineer or other experimenter desires to know whether the observed differences are those of normal sampling fluctuations, or whether the observed differences reveal a real difference amongst the items tested. In either case, the analytical procedure is the same: The variation from sample to sample is compared to the variations within samples in a simple manner; the ratios thus obtained are compared with those in the probability tables appended here.

PB 18806. WHITTAKER, H. Substitution of lower quality industrial diamonds: Thread grinder dresser octahedrons: Progress report, Jul 1-Sep 30, 1943. (War Metallurgy Committee Res Rept W-68) Dec 1943. 20 p. Limited free distribution; thereafter, microfilm-50¢-photostat-$2.00

A survey of the problem of thread grinder dresser tools includes a description of the tools and operations, specifications of diamonds for such tools, requirements and supply of thread dresser octahedrons, and the attempts of tool makers to solve the problem of shortage of diamonds. The survey showed that the natural octahedron shape of diamond is the most suitable for thread dressers, but tool makers have developed substitute shapes to take the place of natural octahedron stones by taking "reject" octahedrons and lapping or bruting them to cone or pyramid shapes. From wear rate tests it was concluded that reject octahedrons, pear-shaped stones and possibly macles, ample quantities of which are available, when fabricated to suitable points, are satisfactory for thread grinder dressing.

PB 18808, 18809. WHITTAKER, H. and ROBERTS, J. T. Substitution of lower quality industrial diamonds, including progress for the period Sep 30, 1943 to Jun 30, 1944: Final reports, Parts I and II. (War Metallurgy Committee Res Rept W-87 and W-137) PB 18808, 34 p. Sep 1944; PB 18809, 40 p. Mar 1944. Limited free distribution; thereafter (each) Microfilm-50¢ - Photostat-$3.00

A study was made to determine if lower quality diamonds could be substituted for preferred qualities and sizes for wheel truing and dressing operations. Wear tests conducted in the Crane Company laboratories showed very little difference in resistance to the abrasion of grinding wheels between the higher and lower qualities. It was observed, during the wear tests, that wear is influenced most by the type of bond of the grinding wheel, the depth of cut taken and the use of a coolant. Part I includes the classification and description of various types of industrial diamonds, as well as results of tests on Congo bort stones. These stones may be substituted for the higher quality varieties in a majority of dressing operations. Part II includes information on X-ray examinations of diamonds, impact tests, and further analyses of wear test data. Tables and radiograms are included.

PB 16498. WINSTON, C. B. Cushioned tube clips (plain without bonding ribbons) submitted by Automotive Rubber Company. 24 December 1942. (Army Air Forces, Eng Div, ENG-M-54-656-614A.) 1942. 2 p. Price: Microfilm-50¢ - Photostat-$1.00

Five sample clips with 7/8 inch tubing as cushioning material made from (1) Sureo American tubing (2) Ethyl cellulose tubing (3) Butyl tubing (4) 1/32 inch all wool felt (5) Neoprene. These were tested in accordance with specification No. 25530. Of the samples submitted, all wool felt is the best substitute for neoprene and its use is recommended.

PB 17522. WORKING, HOLBROOK, and OLDS, E. G. Manual for an introduction to statistical methods of quality control in industry: An outline of a course of lectures and exercises. Apr 1944. 80 p. Price: Microfilm-$1.00 - Photostat-$6.00

This manual prepared by the Office of Production Research and Development, War Production Board, contains course outline by days and class periods, illustrations of control chart principles, and forms.

U. S. GOVERNMENT PRINTING OFFICE 1945